PRODUCTS finishing

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It is an apt saying that a problem once understood is nine-tenths solved—closely akin, we presume, to the old saying about possession being nine points of the law. Following the same reasoning it would seem that most of our metal-finishing "bugs" should disappear if we only understood their nature and scope thoroughly enough.

We might begin in the broadest way possible by asking ourselves the rather blunt question, Just what is metal finishing, anyway, and what does it embrace? We certainly ought to know that one.

According to Webster, when we finish something we bring it to a state of the utmost possible perfection. Anything short of this is not finishing; it is partly finishing. By the rules of logic, however, it is impossible to finish an object partially. A thing is either done or not done, either finished or unfinished. Therefore at the very outset we will have to concede that metal finishing must be perfect, or it is not metal finishing.

Now let us examine the word perfect. A material is perfect when it is incapable of further improvement. Turning again to Webster we find perfection described as a state of being complete and satisfying. That gives us a clue, for no metal-finishing job could possibly be held satisfying which failed under any circumstance to give due and adequate performance. It remains only to consider the scope of those circumstances under which the finished article must not fail.

Metal finishing is carried out for appearance, for protection, or for performance, these being the three fundamental purposes of our trade. That they overlap somewhat is common knowledge, it being the usual case that the first two purposes go together. Nevertheless, the three reasons for metal finishing are entirely different, each one having its own idiosyncracies regardless of the finishing method employed.

Selection of the proper method of finishing to fit one or more of the three basic finishing purposes as outlined would appear to depend logically on the eccentricities associated with the particular purpose in question. The matter of a choice would seem to involve the prerequisite of exhaustive acquaintance with the characteristics of available methods, the properties of the product to be finished, and the peculiarities of all environmental conditions to which the product must eventually be exposed.

This means in effect a policy of continuous study, an attitude of persistent inquiry, and a habit of systematic and logical thinking. The attainment of such an ideal is by no means easy, but it is a reward not beyond the grasp of the diligent.

NOVEMBER, 1944 Vol. 9, No. 2

Radiant Gas Burners in the Modern Oven

By CARL E. MANN

Manager, Stove [illegible] Corp. of America

IT is probable that no [illegible] tor has received more [illegible] tion in the design [illegible] of ovens in recent [illegible] the application [illegible] radiant heat. It is certain [illegible] has received more publicity [illegible]

This study of the utilization [illegible] diant heat has been the [illegible] progress in several fields [illegible] activity, one of which has [illegible] rapid development of [illegible] finishes. Taken together [illegible] opments have all contributed [illegible] other's progress—to the [illegible] there has been a major [illegible] oven design and heat application [illegible] has been well nigh revolutionary.

During this evolution of [illegible] sign, many mistakes have been made as a result of experiments, misunderstandings, and ignorance, but the result of this, industry, today, is producing finished articles far more economically, in a much shorter period of time, in a vastly increased variety, and of a higher standard of quality than was considered possible a few short years ago.

In order to trace this development [illegible] obtain a clear picture of the [illegible] field, it is desirable to draw [illegible] distinction between the various [illegible] of finishes being used in [illegible] as well as the various forms [illegible] which heat may be utilized.

[illegible] are three general classifications [illegible] types of finishes: (1) oxidizing [illegible] lacquer finishes, (2) lacquer finishes containing [illegible] rapidly evaporating solvents, [illegible] thermosetting finishes (thermo- [illegible] which molecular change [illegible] latter the influence [illegible]

[illegible] baking type of finish [illegible] their particularly well [illegible] application of heat. While [illegible] drying time of the finish can be [illegible] drastically reduced when subjected [illegible] heat, this time is still very much [illegible] excess of other types of finishes.

The lacquer type of finish [illegible] presents a serious problem from [illegible] drying viewpoint as the solvents [illegible] evaporate rapidly even at normal [illegible] peratures and an increase in air [illegible] bulance or temperature accelerates [illegible] this evaporation rate. In this type [illegible] of finish, however, the pigments [illegible] maining as a result of the solv[illegible]

removal undergo no further change in their physical characteristics.

The polymerizing type of finish dries slowly at normal temperatures, and this drying is only slowly accelerated for moderate increases in temperature until the critical temperature for the particular finish is reached. At this point, the drying rate is enormously increased and, in addition to the solvent evaporation, an actual physical change takes place in the molecular structure of the finish. The final product is extremely durable. The characteristics of stability at normal temperatures, rapid curing at temperatures around 350 deg. F., and durability and beauty of the resulting finish are obviously very advantageous. The use of the polymerizing type of finish has been expanded into other industrial fields; notably, the textile field.

It is to be emphasized in connection with polymerizing finishes, that both heat and air turbulence act to expedite the desired curing effect, and the more important of these two is heat, as it is the agent for accomplishing the dual function of removing the solvents by increasing their vapor pressure and also producing a physical change in the molecular structure of the pigmentation and causing the finish to "set." This latter result is effected by bringing the finish itself to its critical temperature, which does not necessarily mean the temperature of the whole piece itself; a distinction which will receive consideration later. Air turbulence serves to increase the surface heat conductance and by its scrubbing action speeds the rate of solvent removal.

All these facts show why, since the introduction of polymerizing finishes, oven design has been studied to make the most direct use possible of heat on the finish.

Heat transfer takes place when a difference of temperature exists, and the direction of heat flow is always from the higher to the lower temperature. In an oven, heat transfer is accomplished in three ways: (1) radiation, (2) conduction, and (3) convection. Radiation of heat takes place from all bodies and the amount radiated from any particular body is proportional to the fourth power of the absolute temperature of the body, the exposed area, and the character of its surface. Heat transfer by radiation between two bodies at different temperatures occurs when they are separated by a medium through which radiation can pass. Radiation can pass through both evacuated space and pure air but not through most liquids. The amount of heat transferred by radiation from one body to another is proportional to the differences of the fourth powers of the absolute temperatures of the two bodies and the exposed areas and characteristics of their surfaces.

Conduction of heat between two bodies occurs when the two bodies at different temperatures are in physical contact. Conduction of heat also takes place where there is a difference of temperature between two points in the same body. Heat transfer by conduction depends directly upon the difference in temperature, the dimensions of the bodies, and the thermophysical properties of the bodies.

Convection of heat occurs in liquids and gases, and in this process, new particles of the liquid or gas are continually coming in contact with the heat transfer surface where they discharge or take up heat depending upon the relative temperatures of heat transfer surfaces and the liquid or gas. The actual transmittal of the heat between the surface and the liquid or gas takes place by conduction. The transfer of heat by convection depends upon the temperature difference, the rate of motion of the

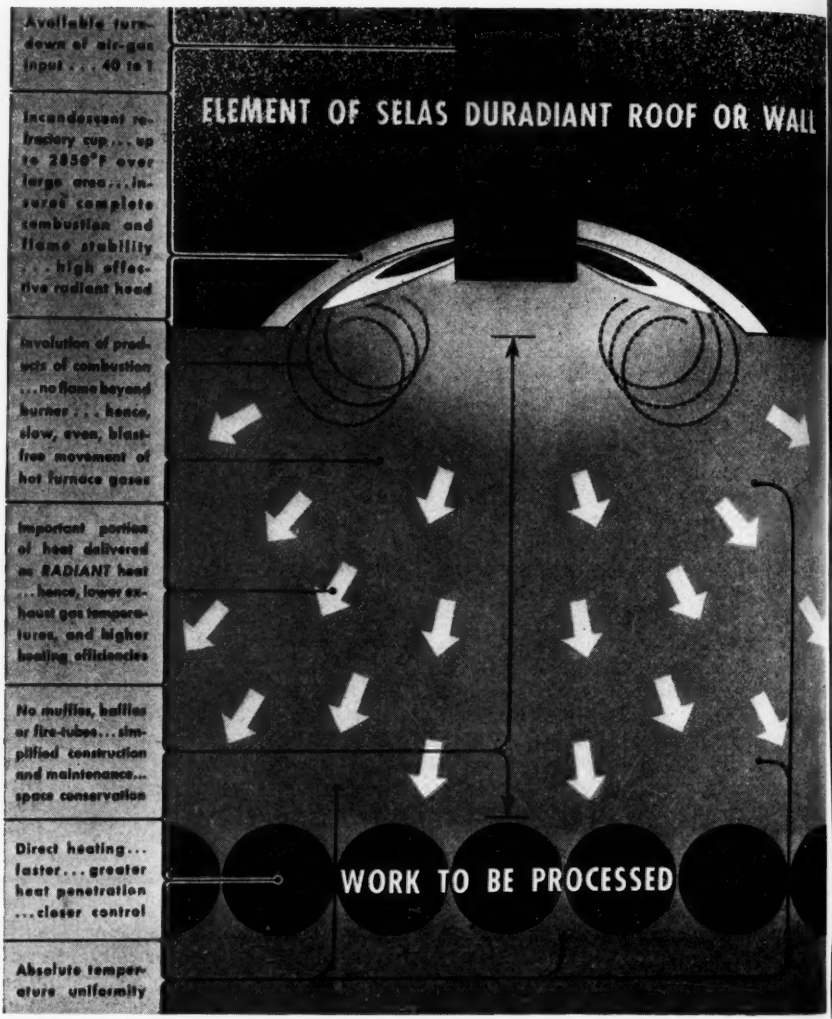
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Fig. 1—The characteristics of a ceramic-cup radiant gas burner explained. Heat is projected both by radiation (indicated by arrows) from incandescent ceramic surfaces and by hot gas convection (indicated by graduated tone). Flame is directed along (not at) ceramic surface.

fluid and the physical properties of the fluid, and the heat transfer surfaces.

From the very nature of the several means of heat transfer, it can readily be observed that heat transfer in any oven actually occurs in all three ways, though ovens are generally classified or designated as either convection ovens or radiant (or

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infra-red) ovens. As a matter of fact, it would be quite impractical if not literally impossible to construct an oven which would be exclusively either a convection oven or a radiant oven because in any radiant oven, for instance, the moment any difference in temperature existed within the oven, natural convection air currents would be set up, and, of course, in any oven differences of temperatures do exist. At the same time in any convection oven heat transfer by radiation occurs from the walls of the oven to the workpieces, and also there is an interchange of radiant heat between the workpieces themselves.

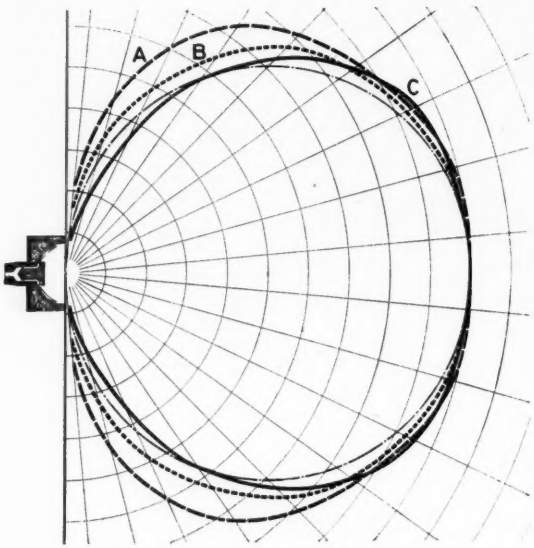

Fig. 2—Radial distribution of radiant heat in front of three typical incandescent-ceramic-cup gas burners operating in open space: (A) 2½-inch cup, normal depth, (B) 5-inch cup, shallow, (C) 6¾-inch cup, extra deep. Maximum radiant intensity (directly in front of burner) considered as 100 per cent in all cases. Curve for each burner is average of four explorations (at 40, 70, 100, and 130 per cent rated consumption). All reading taken with thermopile (± 2 per cent accuracy) 18 inches from center of front face of burner. Note "beam" effect of deep cup, "spread" effect of normal cup, "intermediate" effect of shallow cup. Thin line (circular) is theoretical distribution from small flat radiating disc (Lambert's cosine law).

There have never been any formally recognized definitions of a convection oven or a radiant oven, though these two designations are universally used. In spite of the fact that there have been differences of opinion as to what should be the proper designation in particular cases (as well as many misconceptions on the subject) still there is a rather universal understanding that a convection oven is one in which most of the heat transfer is accomplished by convection air currents (which generally means forced convection air currents by means of fans) and that a radiant oven is one in which most of the heat transfer is accomplished by radiation, or where important effects on the workpiece are accomplished by the application of radiant heat, even though convection air currents contribute a large portion to the heating of the workpiece.

It is, of course, quite practical to construct an oven which will be a combination convection radiant oven. Such a combination might exist in a single zone oven. Or, in an oven designed for a continuous process, the oven might have several zones. It is quite familiar practice, for instance, in an oven designed for a continuous process to sectionalize the oven into three zones; namely, (1) preheating zone, (2) final heating zone, and (3) cooling zone. In such an oven, the entering workpieces receive their heat by forced recirculation of air between

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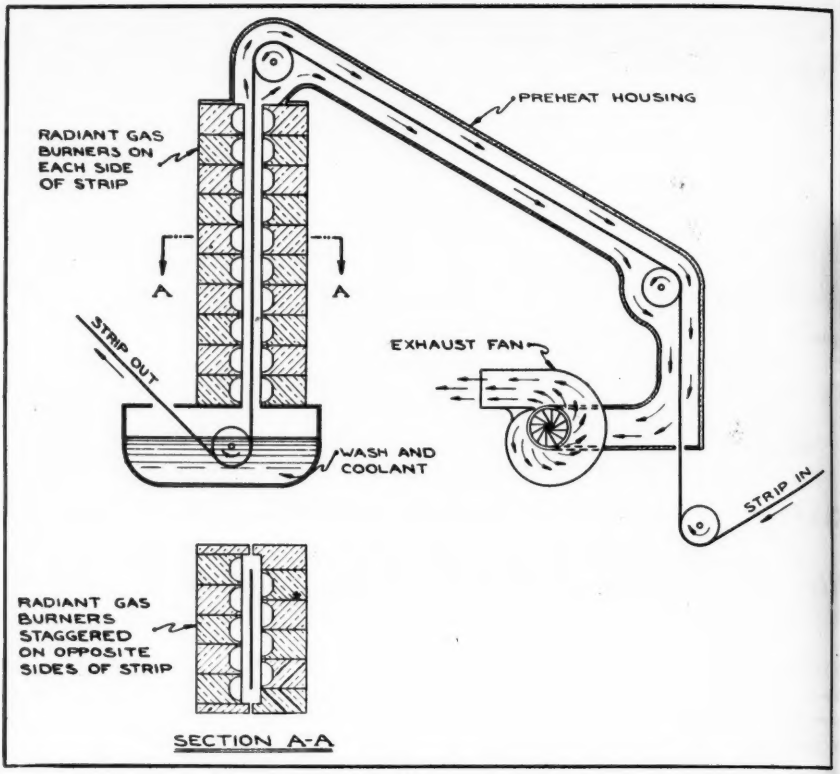

Fig. 3—Diagram of radiant gas burner installation shown in Fig. 4

the cooling zone and the preheating zone, and thereby the heated workpieces leaving the oven give up their heat to the air, and the air in turn gives up this heat to the workpieces in the preheating zone. The main heating zone may be a radiant heating zone or a convection heating zone.

Each method of heat transfer has qualities which can be used to advantage, but there may also be accompanying disadvantages. It is fundamental procedure in an oven design to analyze the heat requirements of the workpiece in the light of its physical characteristics, bulk, and conformation, together with the cost of the various heating media available and the cost of the oven structure. From all these data one must then develop the oven best suited to requirements. Even an elementary exploration of these various aspects can be quite an involved matter.

The primary object of an oven is to provide means of transferring heat at the highest possible rate and at the lowest practical expense, in other words, to provide the most economical means of heat tranfer to the work in progress.

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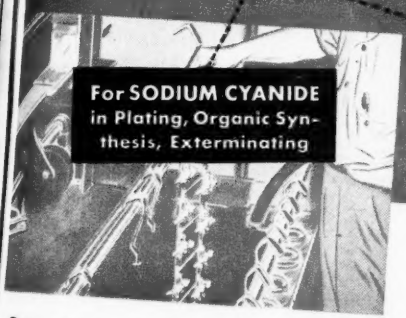

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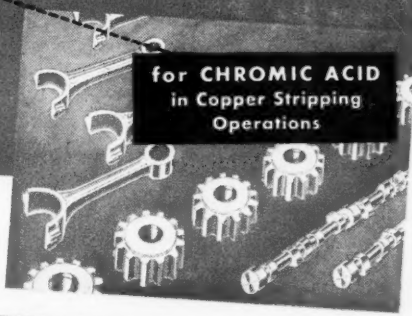

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resistance of the workpiece. This dead-film-effect varies in inverse proportion to the rate of air flow over the workpiece (or air turbulence) which means that high rates of flow require high air velocities. Also, inasmuch as heat transfer by convection is in direct proportion to temperature difference, high rates of heat transfer require a high heat differential between the air and workpiece. Heat transfer by radiation, on the other hand, does not encounter this surface film resistance, and therefore radiant heat becomes an extremely valuable means of rapid heat transfer, as very high temperature differentials are readily obtained.

There are a great many limitations and restrictions regarding the rate at which heat may be applied, so far as various workpieces are concerned. If in the field of general heat absorption, we must dry a workpiece which is porous and bulky and contains considerable moisture throughout, and that piece must be dried without permitting any part to attain a temperature exceeding 200 deg. F., it would be practically impossible to apply radiant heat efficiently, as the permissible temperature differential is too low, and the workpiece itself is not one to utilize radiant heat effectively. If, on the other hand, the material of the workpiece would suffer no harm at a temperature of 1500 deg. F., and if its porosity were such that the moisture could be rapidly evaporated within the material without injury to it, then radiant heat might very readily find proper application.

In the field of curing synthetic finishes, a great contribution has been made in the development of the polymerizing type of finishes. Their properties have already been briefly mentioned. However, one other characteristic is extremely valuable from the heat transfer viewpoint — polymerizing finishes possess a temperature tolerance in the region of the critical temperature which permits a reasonable margin of safety, so that fairly high thermal heads may be employed in raising the finish to the curing temperature without too much danger of overcuring. It is this characteristic which

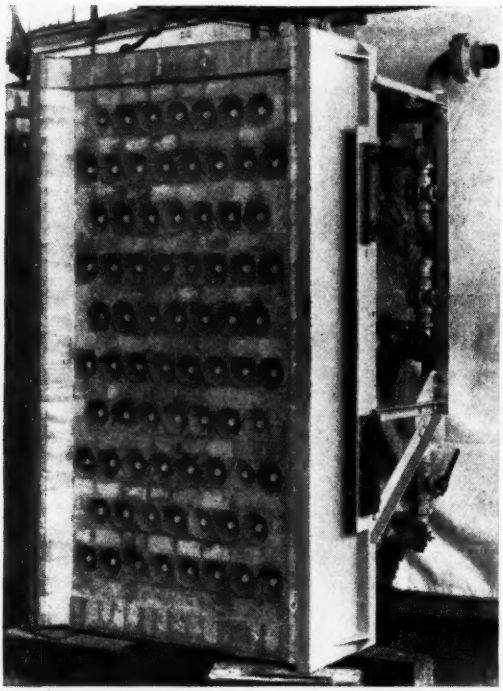
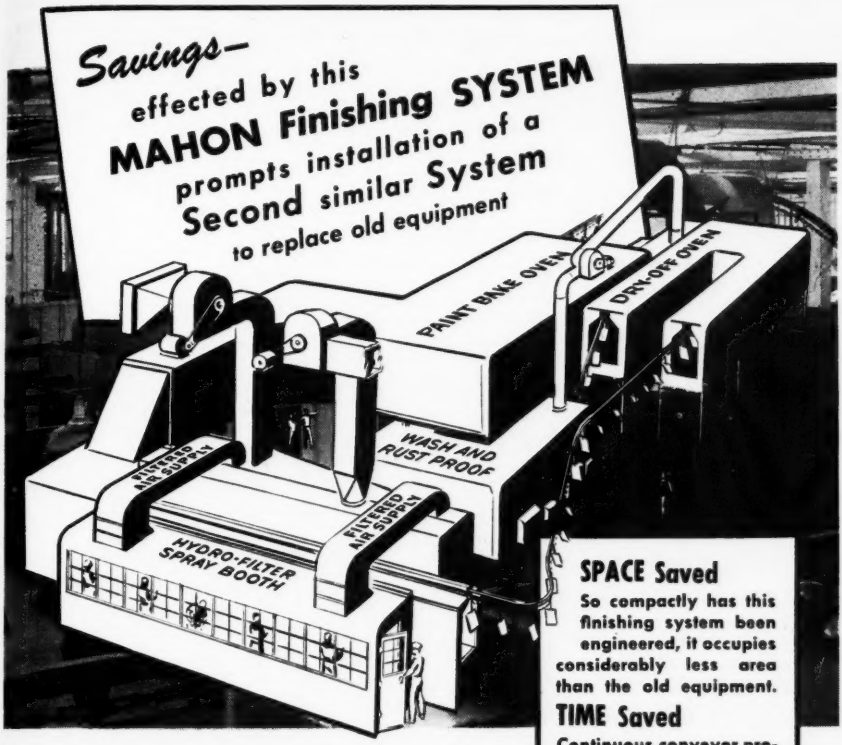


Fig. 4—Illustration showing a completed radiant gas burner installation



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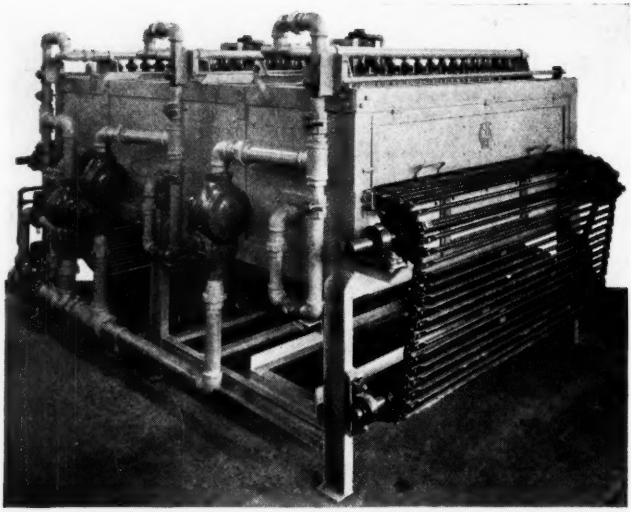

Fig. 5 — Radiant gas burner equipped oven

has permitted the extensive use of radiant heat, because this type of heat is so ideally suitable for high thermal heads and can be so readily controlled. When properly applied, radiant heat installations can be extremely economical of space, and rapid production is assured because these installations are so well suited for continuous conveyor systems.

Radiant heat sources, both as electrical infra-red lamps and as radiant gas burners, have been remarkably developed. Figure 1 illustrates the principle incorporated in one type of radiant gas burner designed to distribute the radiant heat uniformly, and Fig. 2 shows the actual distribution curves of three specific burners, designed for different types of application.

It is obvious that radiant heat is most effective on workpieces when the radiant rays are directed at those pieces. It is possible, of course, to make use of the heat given off by radiant burners even if the radiant burners are placed in locations so that the radiant rays do not actually reach the workpiece, for the heat liberated may be rapidly circulated by fans. However, such an arrangement in an oven makes the oven in reality a convection oven, and it is self-evident that equally effective use of the same amount of heat can be made by the use of less expensive ribbon (or line) burners (or other types of burners) located in the same position if equally efficient air circulation is provided. Therefore, under such circumstances, radiant heat, as such, possesses little virtue and such an oven becomes in actuality a convection oven.

An extremely fortunate application of radiant heat is illustrated diagramatically in Fig. 3 where radiant burners are placed in banks on both sides of a moving strip. It is to be noted also how additional use is made of the products of combustion from these burners where the exhaust fan draws the heated gases over the strip in the convection preheat zone. Figure 4 shows the completed burner installation shown in the diagram of Fig. 3.

Usually, of course, the workpieces cannot be placed so ideally with respect to the radiant heat sources, as the workpieces themselves are irregular in shape. It is under such circumstances that the temperature tolerance of polymerizing finishes becomes important in order that the parts of

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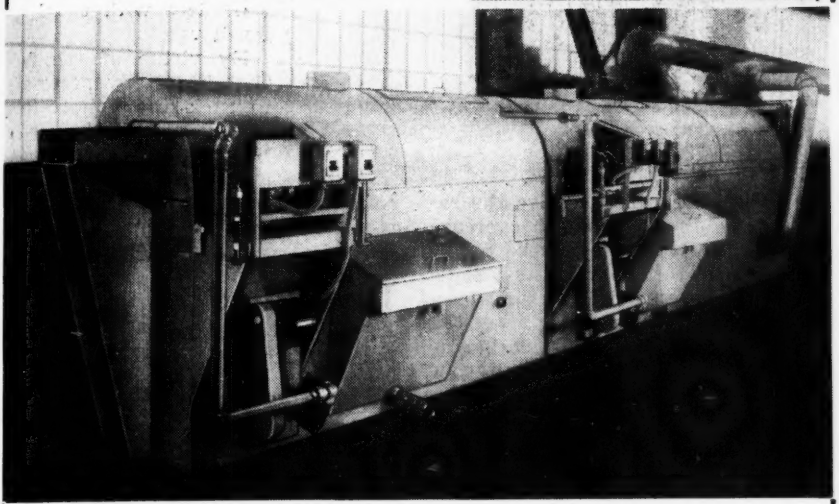

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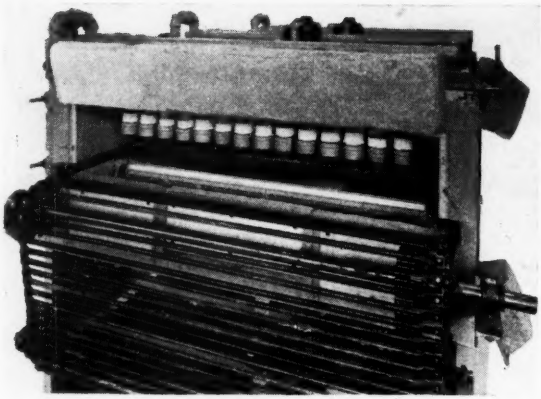

Fig. 6—Close-up view showing arrangement of radiant gas burners of oven pictured in Fig. 5

the workpieces which receive the radiant rays directly do not overcure while the parts which may be partly shadowed or receive rays at oblique angles are brought up to curing temperature.

If the workpieces are metallic or heat conductive, the internal conductivity of the pieces will help to distribute the heat throughout the whole body of the piece, and thereby assist in preventing overcuring. If, however, the workpieces are thermally non-conductive, there is considerable more danger of overcuring the finishes of irregularly shaped pieces.

It will also be observed that if the bodies of the workpieces are heat conductive, it becomes necessary to heat the whole mass of the workpieces in order to attain the proper curing temperature for the finish, but, if the body is not heat conductive, the finish on the surface may readily be brought to the curing temperature without raising the whole mass to the same temperature, providing the radiant heat distribution is satisfactory. It is to be noted, then, that where the finish is to be cured on non-conductive workpieces, the application of radiant heat becomes a more difficult problem because it becomes more important that the radiant heat sources be placed so that the radiant rays reach all parts of the workpiece with equal intensity.

By virtue of the fact that it is only necessary to raise the temperature of the finish to the curing temperature, and not necessarily the whole mass of non-conductive workpieces, such workpieces can be more economical in the use of fuel than conductive workpieces of equal mass.

The oven illustrated in Figs. 5 and 6 show a very suitable application of radiant heat (from radiant gas burners) on flat sheets having thermal insulating qualities. It will be seen that the radiant heat sources can be readily located to provide very uniform distribution over the whole area of the workpieces. It follows from the above discussion that, as compared with convection ovens, radiant ovens are not so adaptable to processing a variety of different kinds and shapes of workpieces as convection ovens. In designing electrical infra-red lamp ovens, attempts have been made to overcome this handicap by arranging the lamps on flexible mounts which can be changed to suit several different shapes of workpieces, but such changes involve additional labor as well as loss of time and materials in experimenting to determine the proper position of the lamps for the various pieces.

The total heat given off from gas radiant burners consists of both radiant heat and convected heat from the products of combustion. The

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Thus vapor degreasing has played a mighty part in war production. Tomorrow, it will be an equally valuable tool for faster fabrication of better peacetime products. For, in good cleaning practice, vapor degreasing is *basic.*

"METAL DEGREASING—STANDARD PRACTICES"

This new booklet, prepared by Du Pont in consultation with equipment manufacturers, outlines the fundamentals of safe and efficient operation of vapor degreasing machines. Copies on request.

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THIS METHOD...

1. **Thoroughly removes grease** and oil from metal parts of any size or shape, usually in a minute or so.
2. **Produces parts clean,** warm and dry—ready for inspection, assembly, further fabrication or finishing of any type.
3. **Minimizes finishing rejects** because vapor reaches and removes grease and oil from deep draws, holes and places which are almost inaccessible.
4. **Reduces risk** of damage to delicate parts.
5. **Can be used alone** or as a part of a process flow line.
6. **Utilizes** compact equipment that fits into small space.
7. **Consumes** only small quantities of solvent. Contaminated solvent is recovered economically for re-use.
8. **Uses** the absolutely pure vapors of a non-flammable solvent as a cleaning medium.
9. **Simplifies** cleaning procedure, is easy to operate as a process.
10. **Saves time and cost**—in its own operation, and in the subsequent handling and finishing of parts.

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***Vapor degreasing is basic for good metal cleaning. For each job there is a suitable cycle or combination of treatments. In every case, the final rinse in pure, uncontaminated solvent vapor assures positive removal of the last traces of grease and oil.**

amount of the total heat and consequently, the amount of radiant heat can be varied between wide limits through the rate at which the gas is burned in each burner. This makes for great flexibility and ease of control. Gas radiant burners are nearly always used where both the heats of radiation and convection may be utilized, and under such circumstances it will generally be found that gas radiant ovens will process a given workpiece with less floor space and at a higher production rate (with consequent smaller unit costs) than either a convection oven or an infrared lamp oven.

Every proposed oven installation, however, is an individual problem, and should receive individual analysis, because only in this way can the most efficient use be made of that powerful but yet misunderstood radiant heat.

Alkyd Resins in "Hammered-Effect" Finishes

ACCORDING to U. S. Patent 2,326,623 granted to E. W. Crosby, alkyd resins are important constituents of new compositions suitable for coating by spraying to give "hammered-effect" finishes. A typical formula lists the following ingredients:

Ultramarine blue pigment	4.1 parts
Lithol red pigment	0.4 part
Bone black pigment	0.1 part
Aluminum flake pigment paste	2.9 parts
Alkyd resin A (solids)	3.0 parts
Alkyd resin B (solids)	30.3 parts
Urea-formaldehyde-monohydric alcohol resin (solids)	0.9 part
Driers (e. g. cobalt naphthenate)	0.2 part
Hydrocarbon solvents (e. g. petroleum hydrocarbons)	57.1 parts
Raw rubber	1.0 part

Our Error

On page 23 of the September issue of PRODUCTS FINISHING, under the heading "Have You Heard That—," reference was made to a method for electrodepositing a continuous mirror-like layer of 90 to 100 scleroscope hardness tin on black iron.

Unfortunately the reviewer who sent in this review obtained it from a defective copy of the July 10, 1944, issue of CHEMICAL ABSTRACTS in which U. S. patent No. 2,338,049 was indicated. In the fifth line of this abstract, reading "—subjecting it to cold rolling with rolls from 90 to 100 scleroscope hardness—," a flaw in the paper in which the reviewer's copy was printed occurred between the word "rolls" and the word "from," making it look as though there was a comma between these two words. The presence of such a comma would tend to give an entirely different and erroneous interpretation of the abstracter's thought. The process alluded to apparently must remain, for the time being at least, in the realm of the fictitious.

"Burring by Flexible Polishing with Greaseless Compounds," an article by H. L. Kellner, Ph.D., The Lea Manufacturing Co., Waterbury 86, Conn., is now being offered in reprint form by this firm. Copy free upon request.

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"QUICK DRY"

STOP-OFF 323

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You won't have to waste valuable time removing Unichrome Stop-Off 323 from plated work. This tough, stop-off lacquer has the mechanical strength to permit quick peeling off—at room temperatures. Besides being easily removed, Unichrome Stop-Off 323 is easily applied by spraying, dipping or brushing—and *fast-drying!* It cuts cleanly at the edges, and adheres firmly throughout the general run of plating baths.

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PROPERTIES

Chemical Resistance—Excellent in all plating cycles.

Application—Can be brushed or dipped—successive coating is minimized.

Drying—Dries quickly at room temperature—adheres without force drying.

Stripping—Removed from work with utmost ease when the plating is over.

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Unichrome Quick Dry Stop-Off 322—for cyanide copper and other plating work requiring an extremely adherent stop-off.

Unichrome "Air Dry" Rack Coating—a rack insulation that can be dipped and dried at room temperature, for use in all plating solutions.

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Unichrome Resist—a solid insulating material for constructing composite racks, stop-off shields, insulating gaskets, etc.

Organic Chemistry

By C. B. F. Young, Ph.D.

Part 1

THE author is attempting to do in a few pages what many authorities have each done in several books. It should be kept in mind, therefore, that many important reactions will have to be omitted. However, the important object which the author is trying to give to the practical plater is a working knowledge of that important and ever increasing field of science, Organic Chemistry. This field is becoming more and more important because organic chemicals are being used more in the field of metal finishing. Thus, lacquers are composed of organic compounds only. Most brighteners are organic in nature as are pickling agents, wetting agents, degreasing compounds of the chlorinated type, emulsifying agents, soaps, and so on. Also, most of the materials removed during cleaning are originally organic in nature, for instance, lubricating agents, oils, greases, drawing compounds, slushing compounds, cutting oils, soluble oils, grinding oils, and acids. In order for the plater to do a good job of removing the above, he should learn something about their structure and properties.

This is the first of a new series of articles on Organic Chemistry, especially written for PRODUCTS FINISHING *by C. B. F. Young, Ph.D. In this work, the author undertakes the difficult task of condensing his writing to give the practical plater a working knowledge of Organic Chemistry and its ever increasing application in the field of metal finishing.*

In following Dr. Young's new series, you may seek further enlightenment on certain points which he will cover. Feel free, therefore, to address your inquiry to Dr. Young, in care of this magazine, for such aid.

May we suggest that you keep all your copies of this magazine so that you will have the complete series of articles on Organic Chemistry. Later, it may not be possible for us to supply duplicate copies.

What is the difference between organic and inorganic chemistry? For a long time the definition of organic chemistry was that field of chemistry in which the products derived were formed by life processes. In 1828 Wohler prepared urea by evaporating an ammonium cyanate solution. This and other compounds were prepared independently of life processes. Now we know that organic chemistry is independent of

life processes. This field is composed of compounds containing mostly carbon, hydrogen, nitrogen, oxygen, and miscellaneous elements such as sulphur, chlorine, bromine, iodine, and so on. Organic chemistry itself is divided into two parts, one of which is known as the alaphatic group and is made up of straight chain molecules, while the other is known as the aromatic group and is made up of cyclic or ring molecules. A good example of the first is gasoline, while the second may be represented by benzene.

There are several hundred compounds of carbon and hydrogen and the saturated over are called paraffins. The simplest compound is methane $-CH_4-$ and is found in natural gas. This material will react with CL_2 as follows:

$$CH_4 + CL_2 = CH_3\ CL + HCI$$
Methyl Chloride

$$CH_4 + 2\,CL_2 = CH_2\ CL_2 + 2\ HCI$$
Methylene Chloride or Dichlormethane

$$CH_4 + 3\,CL_2 = CH\ CL_3 + 3\ HCI$$
Trichlormethane or Chloroform

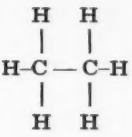
$$CH_4 + 4\,CL_2 = CHCI_4 + 4\ HCI$$
Tetrachlormethane or Carbon Tetrachloride

Methane is a saturated compound. That is, all the valences of carbon are satisfied. Ordinarily, carbon has four valences as shown below:

If all are attached to another atom we say that a saturated compound

results, thus H—C—H is methane.

This material is representative of the paraffin or hydrocarbon series. The group is a saturated one and as such is not very reactive. The two carbon compound is known as ethane and has the formula C_2H_6 and the material has a structure formula as shown below:



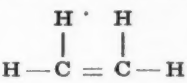
The table below shows other compounds of the paraffin series:

Material	Formula	State
Propane	C_3H_8	Gas
Butane	C_4H_{10}	"
Pentane	C_5H_{12}	Liquid
Hexane	C_6H_{14}	"
Heptane	C_7H_{16}	"
Octane	C_8H_{18}	"
Nonane	C_9H_2O	"
Decane	$C_{10}H_{22}$	"
Undecane	$C_{11}H_{24}$	"
Dodecane	$C_{12}H_{26}$	Solid

It will be noticed that the general formula may be expressed as C_NH_{2N+2}. As the carbon atoms increase, the boiling point rises and the state goes from gas to liquid to solid. As can be seen from the formula, these materials contain only carbon and hydrogen and are saturated or satisfied.

The Olefines

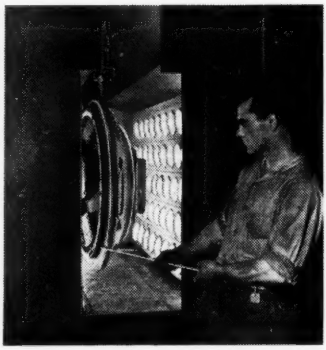
These materials are unsaturated; that is, they have double bonds between the carbon atoms. Thus, ethylene has the formula C_2H_4 and the structural formula as shown below:



Here it will be noted that there are two bonds between the carbons. Thus, only two hydrogens are required now for each carbon.

JENSEN "Dual heat"
INFRA-RED OVEN
Cuts Drying Time on 600 Lb. Assembly from DAYS to ½ Hr.!

Speeds Production for
Westfield Manufacturing Co.



★ At Westfield, 600-lb. Commander's Vision Cupolas are (1) dried in 5 minutes after being washed free of grease, (2) cured in 10 minutes after being spray coated with primer and (3) finish-dried in 15 minutes after being finish-sprayed outside and inside. TOTAL TIME: ½ HOUR! ★ You, too, can speed production with Jensen "Dual-heat" Ovens. Get details from distributors listed below.

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COLUMBUS
Electric Power Equip. Co.
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SOUTH BEND
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209 College Street
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JENSEN SPECIALTIES, Inc.
12151 GRAND RIVER • DETROIT 4, MICH.

If chlorine is allowed to come in contact with ethylene the material adds to the double bond. Thus:

$$\begin{matrix} H & H \\ | & | \\ HC = CH \end{matrix} + Cl_2 = \begin{matrix} H & H \\ | & | \\ HC - CH \\ | & | \\ Cl & Cl \end{matrix}$$

It will be noted that there is no substitution as in the case of a saturated compound. The material formed is dichlorethane. On investigating one will see that there are two possible structures of dichlorethane. Thus:

$$\begin{matrix} H & H \\ | & | \\ HC - C - Cl \\ | & | \\ H & Cl \end{matrix}$$

Symmetrical

or

$$\begin{matrix} H & H \\ | & | \\ HC - C - H \\ | & | \\ Cl & Cl \end{matrix}$$

Unsymmetrical

The latter is formed if the starting product is unsaturated. Using double bonds is a very ingenious way of making many organic compounds. Below is a list of 10 olefines arranged according to carbon atoms:

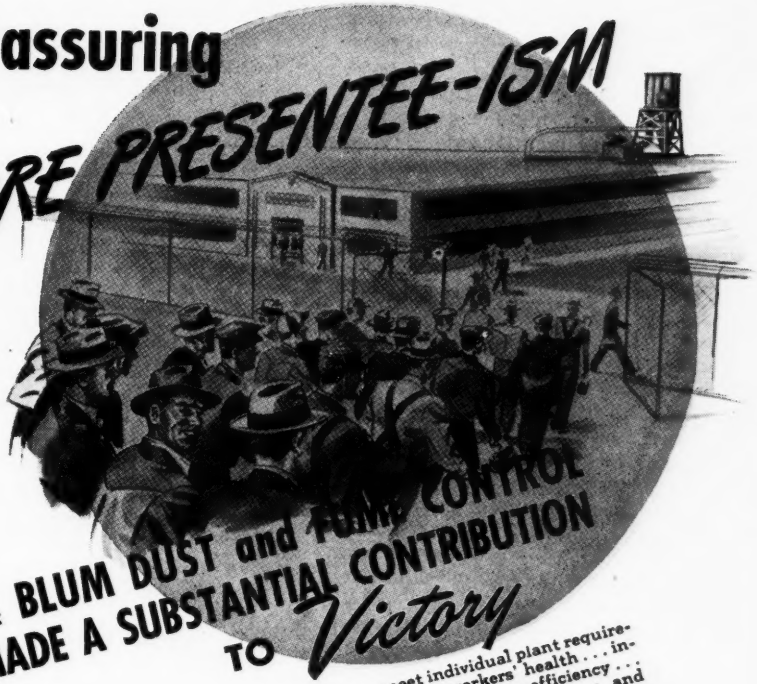
Ethylene	C_2H_4	Gas
Propylene	C_3H_6	"
Butylene	C_4H_8	"
Amylene	C_5H_{10}	Liquid
Hexylene	C_6H_{12}	"
Heptylene	C_7H_{14}	"
Octylene	C_8H_{16}	"
Nonylene	C_9H_{18}	"
Decylene	$C_{10}H_{20}$	"
Undecylene	$C_{11}H_{22}$	"

The general formula for this family is $Cn\ H_{2N}$.

The Acetylene Series

This group is the most highly unsaturated of the carbon hydrogen series. The general formula is C_NH_{2n-2}. If carbon has four valences, there must be a triple bond between the carbons in the two carbon compound. Thus $\begin{matrix} H & H \\ | & | \\ C \equiv C \end{matrix}$ must be the formula of the simplest compound. This material is known as acetylene. There

by assuring MORE PRESENTEE-ISM



KIRK & BLUM DUST and FUME CONTROL HAS MADE A SUBSTANTIAL CONTRIBUTION TO *Victory*

Workers who breathe clear, clean air, free of harmful dust and fumes, are far less susceptible to common or occupational diseases . . . far less apt to join the ranks of temporary or permanent "absenteeism." These "presentees" are not only more consistently on the job—they do a more consistently *better* job.

This is *fact*—proved throughout our period of intensified war production just as it had been previously proved in peace time. The evidence speaks for itself, in the hundreds of plants equipped with efficient dust and fume control systems designed and installed by Kirk & Blum "air engineers."

Kirk & Blum systems are backed by 37 years of specialized engineering experience.

Designed to meet individual plant requirements, they guard workers' health . . . increase man-hours and man-efficiency . . . retard deterioration of machinery and other equipment . . . step up production and lower costs.

In modernizing present equipment or planning for reconversion, you'll be wise to follow the example of leading industries everywhere—by getting the unbiased counsel of K & B "air engineers" on all problems of dust or fume control.

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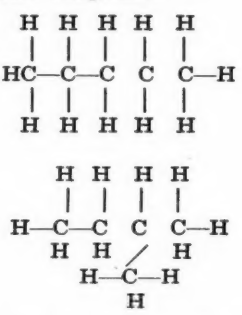
are a number of compounds containing a triple bond but these will not be discussed in this study.

It will readily be seen that a compound having a number of carbon atoms can have more than one set of double or triple bonds. This could be studied in great detail but will have to be omitted in this study.

Structure and Naming of Compounds

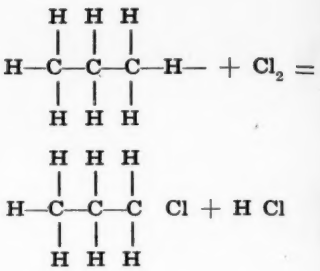
The naming of organic compounds is a very important subject. It generally is based upon groups. For instance —CH_3 is a methyl group, C_2H5 is an ethane group, and so on. If a methyl and a propyl group are put together, one has methyl propane or butaine. Either is correct. As we continue other groups will be named.

In the case of compounds having more than one structure, the materials then produced are called isomers. It should be pointed out that each compound will have its own set of properties, i.e., boiling point, freezing point, and so on. Take for example a five carbon compound:

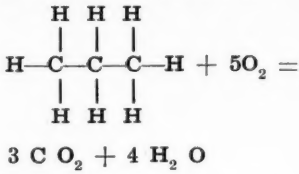


The former does not have the same boiling point as the latter. Methyl, ethyl, propyl groups are designated as alkyl groups. Many times the group is represented by R. Thus, R may mean CH_3, C_2H, and so on. Typical reactions of the paraffins are listed below:

Paraffins can be chlorinated:

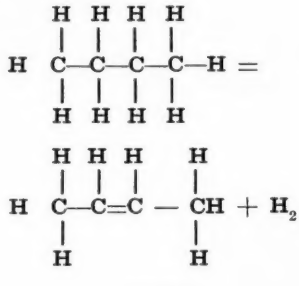


Paraffins can be burned:



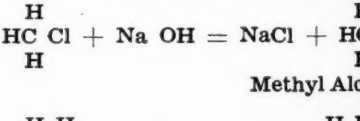
$$3\ C\ O_2 + 4\ H_2\ O$$

Some paraffins can be cracked as follows:

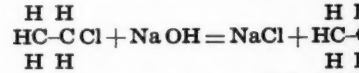


Alcohols

If sodium hydroxide solution is added to methyl or ethyl chloride, the following products are obtained:

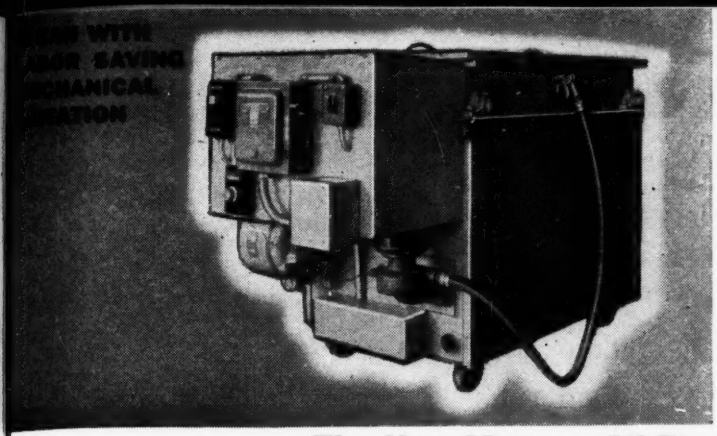


Methyl Alcohol



Ethyl Alcohol

In the first reaction, methyl alcohol is



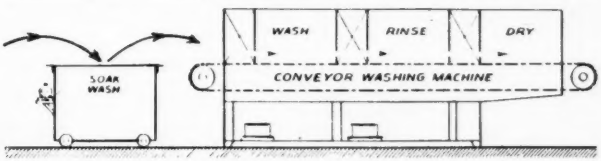
The New Magnus All-Purpose Portable Metal Cleaning Machine

Cleans with agitation of the parts *in* the cleaning solution. Work is given thorough "swishing" contact with the solution assured by fast up and down motion. Made in a wide range of sizes, this machine can be used with any cleaning material and on any metal.

It is particularly valuable when used with the Magnus Emulso-Dip method for precleaning, where thorough removal of chips, abrasive particles is essential.

IN CLEANING BEFORE PLATING, FOR EXAMPLE

Vastly improved cleaning quality is assured when one of these machines is used with Magnus Emulso-Dip solution prior to regular alkaline cleaning in a washing machine, as indicated in the sketch below.



The Magnus All-Purpose Machine is available in a wide range of capacities at prices from $300 to $800 per unit, depending on size and type of heating provided. In many cases, where cold cleaning solutions are used, no heating is necessary.

WRITE FOR THIS BULLETIN

Bulletin 3600 covers the principles, capacities, dimensions and applications of this unique machine. You will find it well worth a careful study.

Magnus

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CLEANERS-METHODS-MACHINES

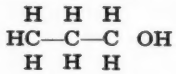
produced while in the second ethyl alcohol results along with sodium chloride. From the above one can see that the OH group is attached to a carbon atom holding hydrogen atoms.

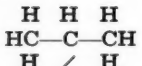
Below is a list of normal alcohols:

Name	Formula	Boiling Point °C.
Methyl alcohol	CH_3OH	64.5
Ethyl "	C_2H_5OH	78.5
Propyl "	C_3H_7OH	97.5
Butyl "	C_4H_9OH	117.0
Penta or Amyl "	$C_5H_{11}OH$	137.8
Hexyl "	$C_6H_{13}OH$	157.0
Heptyl "	$C_7H_{15}OH$	175.8
Octyl "	$C_8H_{17}OH$	192.6
Nonyl "	$C_9H_{19}OH$	215.0
Decyl "	$C_{10}H_{21}OH$	231.0

Isomers of Alcohols

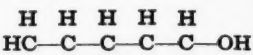
One can readily see that the introduction of an OH group to the paraffin radicals can produce a number of compounds. Thus, the three carbon compounds can have several saturated alcohols as shown below:





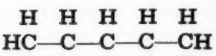
The two compounds are quite different. If the five carbon compound is considered, it will be seen that there are five different compounds, all with the same formula; namely, $C_5H_{11}OH$.

1.



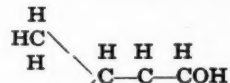
Amyl Alcohol

2.



Secondary Amyl Alcohol

3.

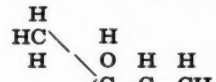


Iso Primary Amyl Alcohol

4.

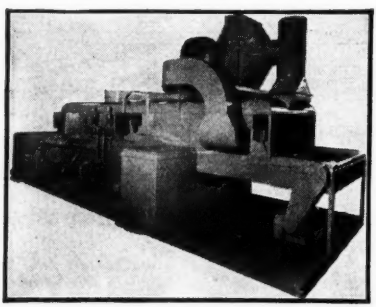
Iso Secondary Amyl Alcohol

5.



Iso Tertiary Amyl Alcohol

From the above one can see that



HYDRO-FLOW
INDUSTRIAL WASHING MACHINES

Streamlined design. Recirculating hot or cold air blow off. Hidden motors, pumps and pipes are easily accessible. Piping and nozzles located to insure thorough cleansing of all surfaces. Rugged and efficient pressure pump. Corrosion resistant spray nozzles—from mist to open stream. Handling alkali to varsol as cleaner. Monorail, Belt, or Gravity type conveyors designed to carry any shape or size material. Variable speeds on conveyor drive synchronize production.

INTERNATIONAL CONVEYOR & WASHER CORP.
Write for circular.
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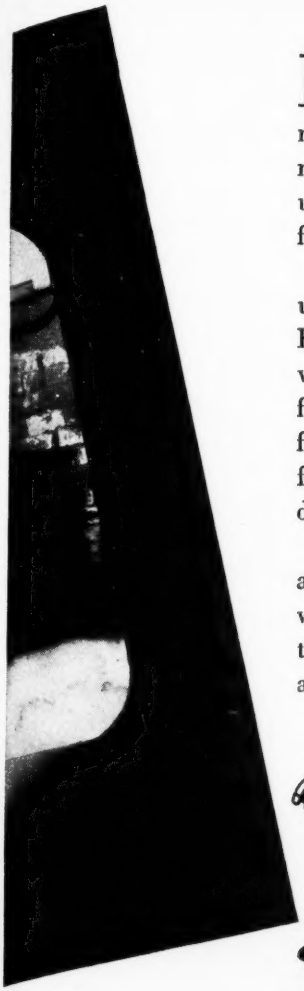
threatens your plant, too!



FIRE, the saboteur, can destroy your plant—even though you've installed the most modern fire-fighting equipment! If your men don't know how to operate it, or if they use the "right" equipment against the wrong fire, disaster can easily result.

Believing that visual instruction is easiest understood, longest remembered, Walter Kidde & Company have produced a color film with sound. It shows exactly what to do when fire strikes. It pictures the different classes of fire, shows how to fight each of them. It's fast-moving, grips the attention of its audience during the twenty minutes of its run.

We'd be glad to show this film to key men at *your* organization. There is no obligation whatever for this service. Just drop a line today to the address below and we'll arrange a showing at your convenience.

WALTER KIDDE & COMPANY, INC., • 140 CEDAR STREET, NEW YORK 6, N. Y.

PROTECT Precise Engineering Surfaces with RUSTEX No. 2

SURFACE CONDITIONER

Prevent inter-department waste caused by RUST

BY USING RUSTEX No. 2

- ★ **in cleaning and rinsing tanks**
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Only a very little of Rustex No. 2 will do the job—just add ¼ to ½ oz. to a gallon of water. Rustex No. 2 is a plain white powder—harmless to hands or clothing. It does not injure the most highly finished metal surface nor will it measurebly increase the physical dimensions.

WE GUARANTEE EVERY POUND OF RUSTEX No. 2 to do what we claim for it. You must be satisfied.

RUSTEX No. 2 is shipped in convenient size containers — order your supply now, prompt delivery assured.

Write for Bulletin No. 101

Manufactured and distributed by

STUART INDUSTRIAL SERVICE
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A Quarter Century of Successful Service to Industry

there are primary, secondary, and tertiary alcohols formed. A primary alcohol has the OH group linked directly to a carbon atom and the latter is linked to another carbon atom. A secondary alcohol has the OH group attached directly to a carbon atom which in turn is connected to two other carbon atoms. A tertiary alcohol has the OH group connected directly to a carbon atom which in turn is connected to three other carbon atoms. The general formula for each is given below.

1. Primary Alcohol — $R\ CH_2\ OH$
2. Secondary " — $\begin{matrix} R \diagdown H \\ R \diagup C \end{matrix} —OH$
3. Tertiary " — $\begin{matrix} R \diagdown \\ R— \\ R \diagup \end{matrix} COH$

Typical reactions of the alcohols are given below:

$$2Na + 2H\ O\ \begin{matrix} H & H \\ C & CH \\ H & H \end{matrix} \rightarrow$$

$$2Na\ O\ \begin{matrix} H & H \\ C & CH \\ H & H \end{matrix} + H_2$$

$$\begin{matrix} H & H \\ HC & C\ OH \\ H & H \end{matrix} + P\ Cl_5 \rightarrow$$

$$\begin{matrix} H & H \\ HC & C\ Cl \\ H & H \end{matrix} + H\ Cl + PO\ Cl_3$$

Ethyl Chloride

$$\begin{matrix} H & H \\ HC & C\ OH \\ H & H \end{matrix} + O \rightarrow \begin{matrix} H & H \\ HC & C=O \\ & H \end{matrix} + H_2O$$

Acetaldehyde

$$\begin{matrix} H & H \\ HC & C\ OH \\ H & \end{matrix} + O_2 \rightarrow \begin{matrix} & & O \\ H & & \| \\ HC & & COH \\ H & & \end{matrix}$$

Acetic Acid

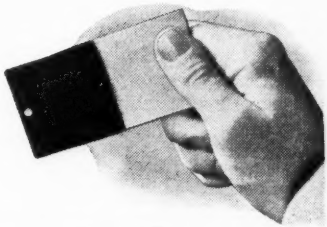
Iridite Now Available IN COLORS!

Zinc, cadmium surfaces of *your* products can now have lasting corrosion resistance plus additional attractiveness!

ALREADY many large manufacturers plan to Iridite all zinc or cadmium surfaces of their products. That's because Iridite has proved itself on the warfronts —and in major testing laboratories—as a highly efficient corrosion-resistant final finish. *Now available in a variety of standard colors,* Iridite gives products a valuable new feature: *added attractiveness and eye-appeal for greater salability.*

The new Iridite colors are uniform and do not fade. Their wide range, plus Iridite's all-out corrosion resistance, means vast new fields of usefulness for zinc and cadmium. And because Iridite is fast-applying and fast-drying, the process does not slow up busy production lines.

And Iridite, because of its outstanding qualities as a base for paint, can be clear-lacquered for greater durability.



Send for Test Panel

Iridite may well be the "finishing touch" that will put *your* product across on highly competitive markets. Send *now* for a sample panel of Iridited zinc or cadmium plating to test in your own laboratory—with *your* product in mind. Write, phone or wire: Rheem Research Products, Inc., 811 Chemical Building, 2523 Pennsylvania Ave., Baltimore 17, Md.

★ ★ RHEEM RESEARCH PRODUCTS, INC. **IRIDITE** 2523 Pennsylvania Ave., Baltimore, 17, Md. ★ ★

Properties of the Alcohols

These materials are reactive as they contain an OH group. It is possible to remove the H of the OH or the whole group. Note the equations above. It can readily be seen that the alcohols are much more reactive than the paraffin group. This group of compounds are important in the industry both as starting or intermediate compounds and solvents. Important alcohols are methyl, ethyl, isoproyyl, glycol and glycerine.

Aldehydes and Ketones

It will be recalled from above that if an alcohol is partially oxidized an aldehyde results. An aldehyde is composed of an oxygen atom connected only to a carbon atom as shown below:

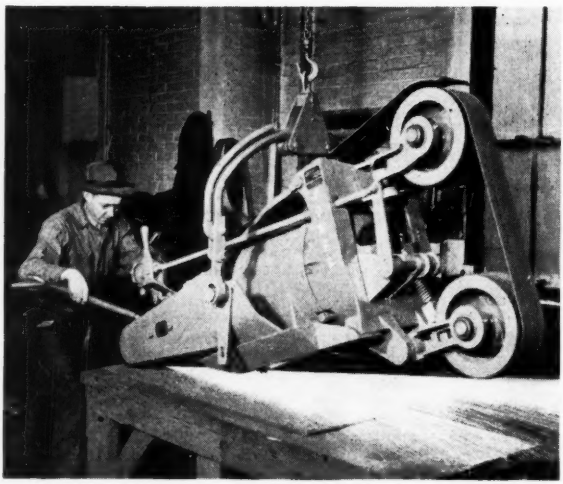
$$-\overset{|}{C}=O$$

The other two valences are satisfied by hydrogen or other carbon atoms. This group is also known as the carbonyl group. Aldehydes are reactive compounds and are used in many industrial organic steps. Some important ones are listed below with their boiling points in C.

Formaldehyde	$HCHO$	21.0
Acetaldehyde	CH_3CHO	21.0
Propionaldehyde	C_2H_5CHO	49.0
Butyraldehyde	C_3H_7CHO	74.0
Valeraldehyde	C_4H_9CHO	103.4
Enanthaldehyde	$C_5H_{11}CHO$	155.
Caprylaldehyde	$C_7H_{15}CHO$	163.4
Capraldehyde	$C_9H_{19}CHO$	208.

A rather interesting reaction occurs when formaldehyde is heated under reduced pressure. A white compound is formed which is paraformaldehyde. This is composed of a number of molecules of formaldehyde joined together. There is no loss or gain in the overall weight. Instead of the formula being (HCHO) it is a multiple of this. The formula now becomes $(HCHO)_x$. When the molecules join together, the boiling point always increases. The boiling point of paraformaldehyde is 162 deg. C. The property of molecules joining together and making longer molecules is known as polymerization. The synthetic rubber and the plastic industry are based largely on polymerization.

(Part 2 will be published in our December issue.)



THE accompanying illustration shows an abrasive belt swing grinder for use in the fast finishing of stainless steel strip, tubing seams, and welds. The grinder is powered by means of a special right angle, totally-enclosed, compact, Westinghouse gear motor which is constructed to withstand shock, overload, and rough service, and to operate continuously in a dusty atmosphere.

The NEW Metal Cleaning

EVEN A FINGERPRINT WILL NOT "TAKE"...

—after a single stage of spray washing by our latest synthetic fluid process. This process is one of the most dramatic results of 11 years of Solventol work with metal-liquid inter-face phenomena and fluid mechanics. Major industries have already proven that it not only removes all greases and inerts instantly—but conditions all metals —against rust, corrosion and hand soil—during production, assembly and inspection. In most applications available washers are convertible. In others, new, compact and progressive units are especially designed to give maximum effect. Write, wire or telephone Solventol Chemical Products, Inc., 15841 Second Avenue, Detroit, Michigan.

MODERN SYNTHETIC FLUID

SOLVENTOL

SUPER-CLEANING

Petroleum Thinners and Their Significance to Metal Finishing, 2

By JEFFREY R. STEWART

A PRIVATE investigation by the writer has indicated that there are many different opinions as to the usefulness of the kauri-butanol test. One company*, for instance, feels that the kauri-butanol value is really not a measure of solvent power, but is rather the measure of the tolerance of a standard kauri gum solution for a given solvent. Notwithstanding these facts, this same organization uses the test, but refers all their determinations to toluol. It is claimed that this procedure eliminates some, but not all, the variables from the test.

Another company** prefers to use a basic standard made from a solution containing 75 per cent by volume of normal heptane and 25 per cent by volume of c. p. toluene. The reason this is called a "basic standard" is because it can be reproduced in any laboratory from two chemical compounds which are readily obtainable and have a specified purity. It has been found that a kauri-butanol solution whose value against this basic standard is 39.0 is considered as being properly standardized and ready for use.

The two chemical compounds used to prepare this basic standard can be obtained from several sources. It has been found that chemically pure toluene from such sources as J. T. Baker Chemical Co., Phillipsburg, N. J.; Merck & Co., Inc., Rahway, N. J.; Mallinckrodt Chemical Works, St. Louis, Mo.; and Barrett & Co., New York, N. Y., meets the specifications required for this chemical. The heptane (normal) can be obtained from the California Chemical Co., New York, N. Y., and must be checked by the Bureau of Standards for boiling range, freezing point, density, and refractive index. This, incidentally, is the same material which is generally used as a primary standard in the testing of gasoline engines for knock-ratings. The only possible disadvantage in the use of this material is the rather high cost.

Sulfur Should Be Absent in Petroleum Thinners

An important test which is frequently omitted in the evaluation of

*From a private communication from Neville Company, Neville Island, Pittsburgh, Pa.

**From a private communication from Shell Oil Company, Rockefeller Center, New York, New York.

petroleum thinners is the determination of the percentage of sulfur. Probably the reason for this is due to the fact that modern methods of refining such products have reached the point where practically all the objectionable sulfur or sulfur compounds are removed, and therefore one would almost always get a negative result in the test. The test, however, is so simple and requires only a slight amount of extra effort that it should be made, especially since it can be sometimes conducted in conjunction with other determinations. Complete methods for determining sulfur by the copper strip method should be used as specified in the U. S. Government and A. S. T. M. specifications. However, a supplementary test is sometimes used and is known as the white lead or "doctor" test.

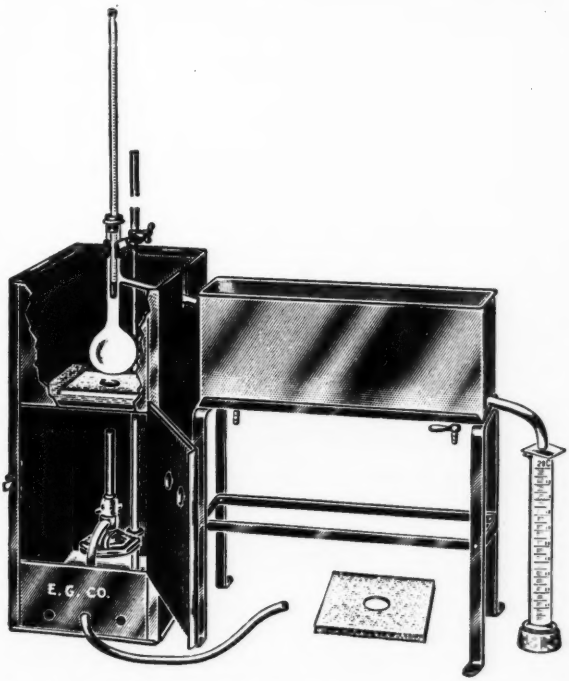


Fig. 1—Correct apparatus for use in determining the distillation range of petroleum thinners. Nearly all petroleum refineries use this device, and it has also been adopted by the U. S. Government, the A. S. T. M. and industrial consumers of petroleum thinners.

The test is conducted as follows: 50 grams of soft paste white-lead-in-oil is mixed with 50 grams of the petroleum thinner under examination. They are allowed to stand in an undisturbed condition at room temperature for 24 hours. For comparison purposes, a mineral spirits (sulfur-free) is also included in the test. Some laboratories use a solution of sodium plumbite in place of the basic carbonate of lead. (See Fig. 2 for device used in this procedure.) The presence of objectionable sulfur or its compounds will be manifested in a darkening of the sample. Other methods for determining sulfur may be found in any of the several laboratory handbooks now available.

There are two main reasons why sulfur is objectionable in petroleum thinners. In the first place, an unpleasant odor is usually the result of sulfur or its compounds. We usually refer to this as a "sour" product. This means that the disulfides have been reduced to mercaptans, and it can usually be traced to a lack of proper refining methods. The antonym of the term "sour" is "sweet." A "sweet" naphtha or mineral spirits, therefore, is one which has been sub-

jected to a reaction which transforms the elemental sulfur to lead sulfide and organic disulfides. This is usually accomplished in the petroleum refinery by treatment with lead mercaptides. The result is a fraction which has a rather pleasant and characteristic odor.

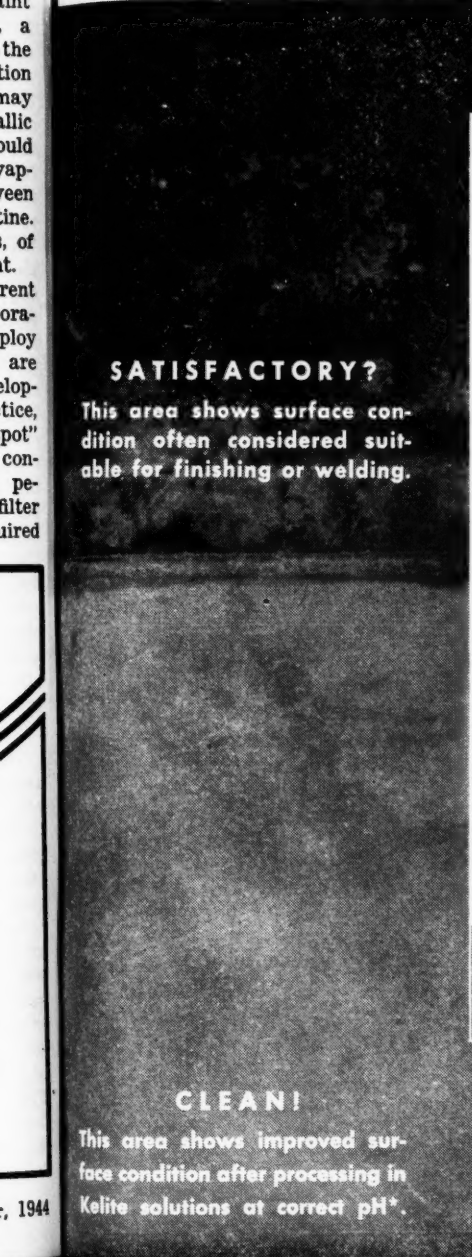
The other main reason why sulfur is objectionable is due to the darkening effect it has on paints or enamels containing lead components. Since the combination of lead and sulfur produces lead sulfide, and since lead sulfide is black in color, it is easy to conceive how a small formation of this compound would be objectionable in a light colored paint or enamel.

The Evaporation Rate Is of Prime Importance

Since increased production during wartime activity is being encouraged nearly everywhere, it is obvious that the evaporation rate of the petroleum thinner is extremely important in addition to the drying time of the paint or enamel. There is, however, a rather limited tolerance as to the minimum and maximum evaporation rate permitted. In general, it may be said that for the average metallic object being coated, a solvent should be used having a comparative evaporation rate lying somewhere between that of toluene and turpentine. Special conditions or applications, of course, would void this statement.

There are at least a dozen different methods for determining the evaporation rate. The methods which employ the use of scientific instruments are used mostly in research or development work. In general practice, however, the filter paper "spot" method is used. This merely consists in placing 0.5 ml. of the petroleum thinner on a piece of filter paper and noting the time required

The background of this advertisement from an unretouched photo of low carbon steel graphically illustrates the result of scientific processing under Kelite pH Control


SATISFACTORY?
This area shows surface condition often considered suitable for finishing or welding.
CLEAN!
This area shows improved surface condition after processing in Kelite solutions at correct pH*.

"pH"
is the Key to
SCIENTIFIC
Cleaning

The efficiency of many industrial cleaning operations often suffers from the inertia of tradition, or from disturbance by unknown chemical factors. A pH test and analysis by a Kelite Service Engineer may show you how to speed-up production and improve performance—how to save money, conserve man-hours.

**The improvements in painting, enameling, plating, galvanizing or welding, which result from such processing with pH control, give Industry the key to new standards of speed and excellence. The same principles apply to all cleaning operations, from dishwashing to metal finishing. Send for the facts about Kelite chemicals which clean through pH control.*

Manufacturing Plants in LOS ANGELES, CHICAGO, PERTH AMBOY, HOUSTON • Branches in Principal Cities

Chart Copyrt '42, Kelite Prod., Inc., 909 E. 60 St., Los Angeles 1

KELITE

SCIENTIFIC CLEANING THROUGH pH CONTROL

KELITE pH Control

for the spot to disappear. A room free of drafts and a tempertaure of about 77 deg. F. should be used. It is always a good idea to include some other standard solvent such as turpentine or toluene for comparison

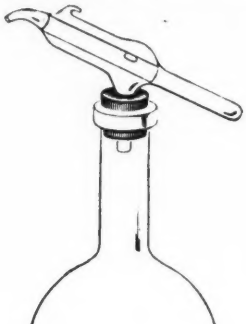


Fig. 2—Automatic measure with Pyrex flask. This apparatus is useful in the determination of sulfur compounds in petroleum thinners by the "doctor" method in which sodium plumbite is used. Since it is difficult to dispense the strongly alkaline "doctor solution" from ordinary burettes, this form of apparatus has been found to be very serviceable. By simply tilting the flask, 5 ml. of the solution are automatically measured out into the top, and then by tilting in the opposite direction, the solution can be transferred into the bottle or test tube used in the test.

purposes, although this is not always essential.

The Future of Petroleum Thinners from an Economic Standpoint

Most of us will remember that about six months ago the newspapers devoted a considerable amount of space both from a news and editorial standpoint regarding the threatened shortage of petroleum products due to the world's natural exhaustion of crude oil. Such a shortage, it can be observed, would indirectly affect the metal-finishing industry, since petroleum thinners are practically indispensible for use in protective and decorative coatings.

The pre-war world consumed nearly 2,000,000,000 barrels of petroleum oil per year, or almost a barrel per person. The world's proved petroleum reserves would be used up within about 10 years if we continue to maintain the present standard of living, and the rest of the world would have an average of half as high a standard as our own. Therefore, in the world that we envision, we will require several times the 2,000,000,000 barrels per year if the postwar world is to get what they are expecting. There are only two solutions to the problem. One is to find more oil and the other is to eliminate as much waste as possible. America can do both. There is scientific evidence that there is plenty of petroleum somewhere beneath the earth's surface, and petroleum technologists know how to find it. The only difficulty, according to most of the large petroleum refiners, is the lack of a world policy regarding petroleum. It must be a world policy, it is contended, because there is petroleum in many parts of the world, and the supply in the United States is rapidly being depleted. We have supplied 60 per cent of mankind's petroleum in the past, but now we are beginning to realize that we cannot keep this up forever. The greatest unexplored and undeveloped reserves are in (1) Russia, (2) the Near East, (3) Gulf of Mexico area, (4) Caribbean Sea area, (5) islands in the East Indies, (6) islands in the Pacific, (7) Curacao and Trinidad, and (8) several of the British possessions.

It is felt by many leaders in the petroleum industry that the Atlantic Charter will provide for the fair distribution and production of petroleum products in the postwar world. However, it is rather far-fetched to consider a condition where the tables

DIP + AGITATION =

better batch cleaning of metal parts

The OPTIMUS Dip-Agitating Type Portable Washing Machine is ideal for cleaning, washing, paint stripping, anti-rusting, rust-proofing, rinsing, chemical treatments, coating, etc., wherever production, maintenance, or repair needs do not require a spray type machine.

To the soaking action in the cleaning solution is added a strong mechanical agitating action. The vertical up and down dipping motion of the load in and out of the liquid is effective in many cases in speeding up the cleaning operation, reducing time involved by as much as 50% to 75%.

Advantages

- Can handle any parts, in baskets on racks, or individually
- Can be used with any cleaning agent (alkaline, solvent emulsion, straight solvent)
- Easy handling of parts
- Fast cleaning
- Can be heated by any means
- Less wearing parts
- Portable, easily moved
- Agitation costs less than 2¢ per hour

SEND FOR your copy of new Bulletin 4E2 "Batch Cleaning in Portable Metal Washing Machines". Bulletin 4E1 describing other "OPTIMUS Machines For Every Metal Washing, Cleaning and Drying Problem" also available.

OPTIMUS Spray-Type Machine

A spray washing machine of similar arrangement and portability, for the cleaning of relatively small series of large, heavy, parts in process of fabrication, or before, and during, maintenance and repair. Especially suited for handling of diesel, auto and airplane engines, compressors, pumps, motors, etc. Also, smaller parts in baskets, or on racks.

OPTIMUS
EQUIPMENT CO.
MATAWAN, NEW JERSEY

Engineers and Manufacturers of Washing, Rinsing, Pickling and Drying Equipment for Metal Parts

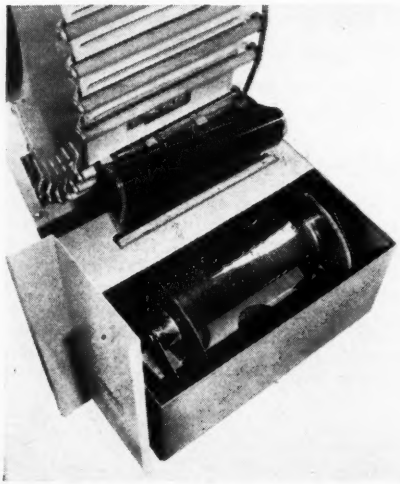
would be turned such as, for instance, the United States importing petroleum from foreign countries instead of the reverse procedure.

One of the outstanding reasons why we can feel fairly safe with regard to the future petroleum situation is the fact that we have certain conservation laws in this country. American experience has found a way to maintain our petroleum reserves without curbing enterprise or retarding the progress of the petroleum industry. Under the conservation laws of the states where oil is produced and the covenants of the Interstate Oil Compact made with the approval of Congress, our national demand for petroleum is supplied by ratable withdrawals from the oil fields. Under this system, the governing authorities of Pennslyvania, for example, fix quotas for the production of petroleum within the state. And this is done at an open public hearing.

There will be no serious shortage of petroleum or petroleum products in the postwar era if cooperation can be attained between nations similar to that between States in America.

Roll-Film Dryer Utilizes Armco Zincgrip-Paintgrip

A ROLL-FILM dryer for aerial photographic work which dries film five times faster than the previous method and saves scarce alloys has been developed by The Lau Blower Company, Dayton, Ohio, in cooperation with technicians from the Army Air Corps at Wright Field.



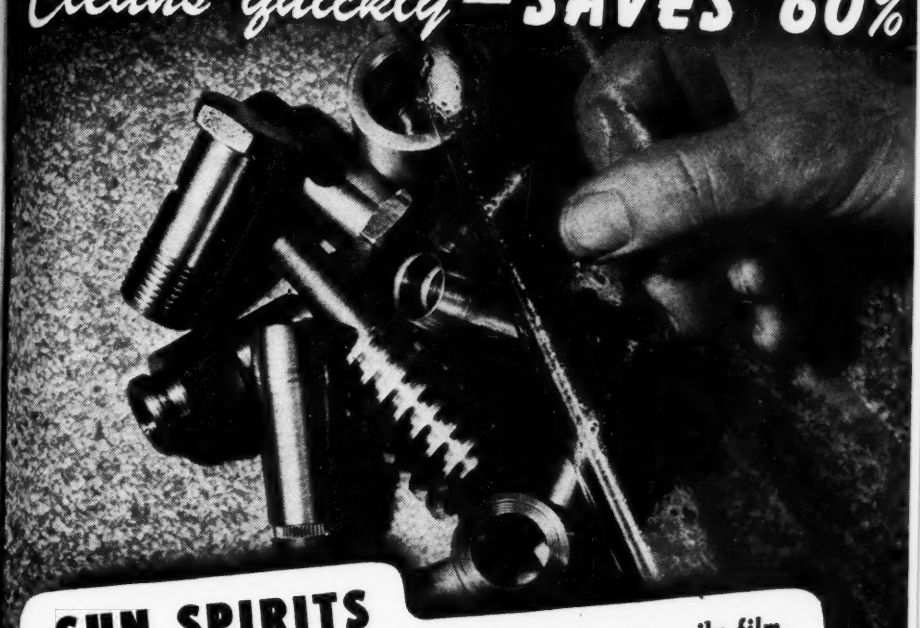
Armco Zincgrip-Paintgrip is used in the construction of the roll-film dryer shown here, thus saving critical alloys.

Time-saving in the combat zones is a "must" to operations officers. Drying of films formerly required three hours; now it is done in little more than 30 minutes. This gives intelligence experts up-to-the-minute information about enemy defenses during and after air raids.

The use of Armco Zincgrip-Paintgrip in the construction of the dryer conserves many tons of critical alloys for other vital war jobs. Armco Zincgrip-Paintgrip is a zinc-coated metal which can be formed or drawn without flaking or peeling of the protective zinc coating. Its bonderized surface takes and preserves paint.

Udylite Koroseal Tank Linings which are said to bond ideally to metal, concrete, and wood and to resist strong oxidizing acids and corrosives are described in an illustrated bulletin released by The Udylite Corp., 1651 E. Grand Blvd., Detroit 11, Mich. Copy free upon request.

Cleans quickly—SAVES 60%



SUN SPIRITS

Cuts metal cleaning costs 60% . . . quickly removes oily film

In a plant manufacturing machine parts, production-hampering delays were found to be the direct result of their metal cleaning operations.

Oily film remained on parts. The metal cleaner in use did not clean thoroughly.

A Sun Engineer, called in on the problem, advised that with Sun Spirits, not only could troublesome delays be eliminated, but considerable savings were possible.

A switch to Sun Spirits proved his statement. Now, oily residue is dislodged quickly and thoroughly. The minute pores of the metal are penetrated . . . parts are sparkling clean. Time is saved, too, because Sun Spirits requires no mixing or heating.

A 60% saving in costs was also effected by the change . . . and no complaints have been received from the operators.

This is typical of the excellent performance Sun Spirits is giving today, in many plants. It can help you attain the same efficiency, and economy in your plant. For more details, write for your free copy of "Case Histories of Cleaning Up War Parts."

SUN OIL COMPANY • Philadelphia 3, Pa.

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SUNOCO **SUN INDUSTRIAL PRODUCTS**

HELPING INDUSTRY HELP AMERICA

The Size Characteristic of Polishing Abrasives

By HENRY R. POWER
The Carborundum Company, Niagara Falls, New York

CONTINUED research on polished metals has brought forth developments of interest both to the practical polisher and to the producer of abrasives. For instance, a diamond point moving along a highly polished steel meets surface irregularities that may be magnified 1,700 times and photographed to look like mountain ranges. This is a quantitative way of measuring polish.

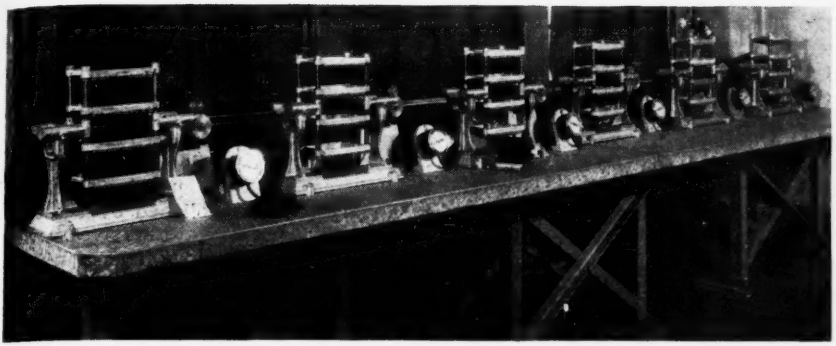
Also, proper polishing is now known to produce a polish layer of remarkable properties, one of which is its vitreous or glassy nature. The development of this polish layer by polishing and buffing is the function of the polishing shop. The advantages of the polish layer are its continuity, the absence of pits and cavities which reduce corrosion; also, an increase of hardness at the surface. While this polish layer, or vitreous skin, is only a few hundred-thousandths of a millimeter thick, the metal layer below this is disturbed to a much greater depth, below which, again, is the original undisturbed material. The earlier stages of polishing are, therefore, important since they prepare the surface for buffing which develops the polish layer. Buffing operations can be simplified by care in polishing.

The polisher, therefore, is concerned with the careful selection of abrasives for use in the earlier stages, and one property he wants, among others, is uniformity of size from one shipment

Enlargement of a photograph of abrasive grains. Uniformity in the size of abrasive grains is important for good polishing wheels.

to another because this, in part, controls the size, shape and distribution of surface irregularities on the metal which is applied to the polishing wheel coated with the selected abrasives.

Oversize particles in the grit he selects definitely scratch the surface; that is, they produce occasional surface irregularities on the metal that



Battery of machines used for testing the uniformity of size of abrasive grains

are wider or deeper, or both, than the average effect desired in the particular operation.

These scratches may not be visible until the product is submitted to other operations like plating, lacquering, and so on, thus incurring expense and rejection of product at the final inspection. Too many undersize particles, on the other hand, slow up the cutting action of the abrasive and so affect the economy of the polishing shop.

The producers of electric furnace abrasives have long given consideration to the importance of size uniformity for polishing grains and a control has been established by the use of apparatus that is as accurate as modern technology permits. The original test method used for sizing grits was by hand shaking through a sieve and measuring the percentage retained in passing the aperatures. In handling tonnages of abrasives for the polishing trade, the factor of fatigue was apparent, so a mechanical method was sought to perform all that hand shaking could do or, if possible, to do it better.

This involved a study of the operations performed by hand, whether horizontal or vertical, whether the sieve was tapped to clear the clogged aperatures, the time factor required to bring the sifting to an end point where few particles passes the aperatures, the peculiarities of abrasive grits under the sifting action because of their irregular shapes, and so on.

There was evolved a test sifter in which a standard weight of grit could be shaken for a specified time on properly selected sieves to yield analytical results easily duplicated on this machine and on other machines built to the same specifications. Because of the completeness and accuracy with which this sifter shook the particles through the sieves, the old hand method was abandoned and whole batteries of test machines are now in use for controlling accurately the size uniformity of the surface tenacity abrasive prepared especially for use of the polisher and known as Aloxite TP aluminous abrasive.

As one degree of accuracy leads to another, the matter of sieves had to be given attention, and fine silk screens are now especially selected for use in the laboratory sifter. Not only are the dimensions of the aperatures and the size of the thread measured, but a practical sifting test is made on a standard grit which is designed to give certain analytical values for the sieve in question.

Silk lends itself to abrasives testing because of the ease with which

the aperatures are cleared. Metal wire sieves easily clog with abrasive particles so that the full area is not completely utilized at all times. This obviously affects the effective screening action of the sieve.

Silk, while it has the foregoing advantages, is, nevertheless, affected like all textiles by humidity conditions. The analytical results in a warm dry room in the winter seasons, when the relative humidity is around 15 per cent, are quite different from the results on the same sieve during the humid summer months when the relative humidity is 80 per cent. These variations had not been measurable by former methods of sifting and were brought out clearly when the new test sifter was evolved, so abrasives testing for size is now performed under controlled atmospheric conditions where the temperature and relative humidity are constant. This is another contribution of the electric furnace abrasive producer to the efficiency and economy of the polishing shop. As a result, every shipment made can be guaranteed to be exact in its duplication, leaving the polisher free to concentrate on the other factors involved in the production and use of polishing wheels. Metal surfaces polished by these accurately prepared abrasives, when tested with the instrument mentioned in the opening paragraph, are bound to give fewer "mountain peaks" which is, of course, the aim of the polisher. The surfaces are better prepared for the subsequent operation known as buffing.

Udylite Handiplater, a complete, portable, small size plating unit which is said to be ideal for plating odd lots of small parts, is illustrated and described in a bulletin issued by The Udylite Corp., 1651 E. Grand Blvd., Detroit 11, Mich. Copy free upon request.

Now Available AGAIN!

BALLOU'S IMITATION

CHROME ALUMINUM PASTE

- Will produce a beautiful imitation of a real plated finish when used in conjunction with quick bake synthetic or varnish type vehicles.

Send for Sample and Prices

EDWARD C. BALLOU CO.

6 Varick Street — New York 13, N. Y.

Durable Paint Coats Require CLEAN-CONDITIONED SURFACES

DEOXIDINES

have long been recognized as ideal metal cleaners, their unusual merits as perfect conditioners have often been overlooked.

There is a grade of Deoxidine to meet your specifications for cleaning and conditioning.

The efficiency of Deoxidine is already well established: if you have not tried Deoxidine, the speed, economy, simplicity and effectiveness of its processes are easily demonstrated in your own plant and under your own working conditions.

AVOID PAINT FAILURES

Deoxidine cleans all metals, except zinc and cadmium, completely and destroys visible or invisible chemicals which, if permitted to remain, would cause premature paint failures—at the same time minutely etching and conditioning the surface, thus providing a most satisfactory bond for paint coats. In addition to properly preparing aluminum for painting, Deoxidine cleans it most acceptably in preparation for "Alrok"* coatings.

DEOXIDINES FOR VARIED USES

There are types of Deoxidine for application with brushes, by immersion in suitable tanks or by spraying in power washers. Grades also of each of these types that adapt them to the removal of much or little rust and oil. There are processes worked out for the use of Deoxidine in large or small production and for big or little work.

The experience of ACP Laboratories and Technicians is at your service to advise the Deoxidine best suited to your needs.

*Reg. T. M. Aluminum Co. of Am.

Note—West Coast Plants may address inquiries and orders for prompt delivery to Leon Finch, Ltd., 728 East 9th St., Los Angeles, California.

Manufacturers of Inhibitors & Metal Working Chemicals

AMERICAN CHEMICAL PAINT CO.
AMBLER ACP PENNA.

American Chemical Paint Company, Ambler, Pa.
Please send me general Technical Service Data Sheets on ☐ *Deoxidine* ☐ *Peroline*

Name .....
Title .....
Company .....
Address A-11

Varnish for Cartridge Cases

ONE phase of the development of steel cartridge cases was never satisfactorily solved. This was the matter of providing a finish which was corrosion-resistant under all conditions so that the ammunition could be guaranteed to be delivered to the using troops in a completely satisfactory state. Corrosion resistance on steel has for many years been a serious problem to industry, and the severe treatment given cartridge cases made this problem even more serious. It was originally intended to attempt corrosion resistance by the use of copper plating. It was hoped that a dual purpose would thus be served, since the presence of copper plating on the steel would assist materially in lubricating the draw work, and, with a final finish of copper, residuals left from the drawing processes would not have been detrimental. However, since the basic mission of the conversion program was to eliminate copper, it was necessary to abandon this material. In addition, copper plating does not provide any great amount of protection, particularly if the plating is marred. As an added objection to plating with copper or other metals, the amount of equipment involved would have required tremendous expenditure of copper in generator windings, bar construction, and the like.

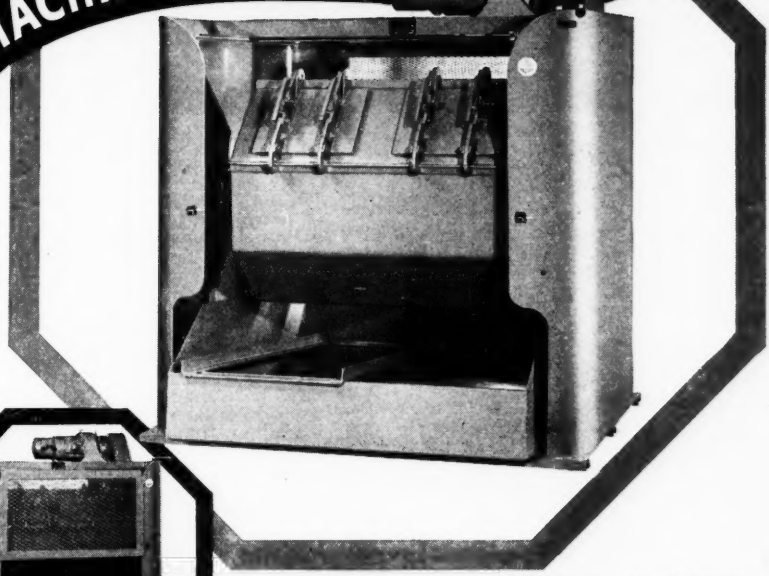
Therefore, while it was fully appreciated that a varnish or lacquer film could not be considered by any means optimum, it was felt that a lacquer finish could be developed which, when properly applied over well-prepared surfaces, could be depended upon to give fair performance. It was necessary to develop a finish which not only gave protection against corrosion and abrasion but which also was completely compatible with any materials that might be encountered due to the presence of propellent powder. Further, the finish must stand up at the elevated temperatures encountered in the weapons and must have a surface condition such as to cause no tendency to adhere to the gun chamber and thus interfere with proper extraction.

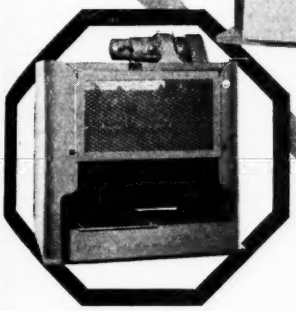
The suppliers of resin and the manufacturers of phenolic finishes did an outstanding job in developing a thermosetting phenolic varnish which gave excellent protection against most of the conditions encountered and, when applied properly over a thoroughly inhibited surface, a fair protection against corrosion. As a matter of fact, certain types of climatic exposures encountered in the present war showed the steel case with its phenolic coating superior to brass.

The endeavor to convert the manufacture of artillery cartridge cases from brass to steel was known at the outset to be an almost herculean task. Many companies participated in the project; some contributed much, and all contributed something to the knowledge obtained.

—Army Ordnance Report

ANNOUNCING THE NEW ROTO-FINISH WET PROCESS MACHINE BW-45 ★





For DEBURRING, GRINDING, FINISHING

The amazing Roto-Finish process gets better and better. Now the machine itself has been vastly improved. The all steel cylinder of the new BW-45 is welded rather than bolted. It has a new, lighter weight steel door. In addition, an opening is provided at the back. Compartment wood linings can now be periodically replaced without removing the cylinder from the machine.

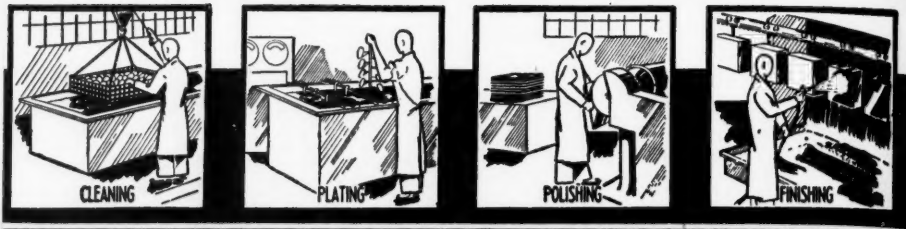
The new streamlined sheet steel outer shell not only improves appearance but adds considerable structural strength to the framework of the machine itself. And the heavy mesh door (shown in smaller photo) gives complete protection to workmen from all moving parts.

Send for complete particulars on this new machine and the Roto-Finish process that cuts finishing costs on steel, brass, aluminum, magnesium, stainless steel and nickle steel parts.

THE STURGIS PRODUCTS CO.

284 Jacob Street, Sturgis, Michigan

ROTO FINISH



News of the Industry

Dr. Ross Returns to Sun Oil

Dr. Edgar S. Ross has completed his assignment as chief of the Lubricants Section, Aviation Division, Petroleum Administration for War, Washington.

Dr. Edgar S. Ross

D. C., after serving for a period of 15 months. Prior to serving with PAW, Dr. Ross was assistant manager in charge of specialties, Development Division, Sun Oil Co., Marcus Hook, Pa. He has returned to the Sun Oil Company with offices at Philadelphia, Pa., where he will devote his full time to the development of technical sales with the Industrial Products Department.

For five years, Dr. Ross was a Senior Research Fellow at the Mellon Institute of Industrial Research located at Pittsburgh, Pa., where he became well-known for his investigations in the utilization of petroleum products for highway and building construction, waterproofing, and various industrial applications.

Rogers Organizational Changes

Due to the death of George S. Rogers, president, several organizational changes have been made by G. S. Rogers & Co., 228 N. LaSalle St., Chicago 1, Illinois.

John J. Couch, formerly vice president, has been elected president, while E. L. Milford has been promoted to vice president. In addition, David H. Henry has been elected vice president and secretary, and Royce R. Baker, treasurer.

Pennsalt Whitemarsh Research Laboratories

On October 4, 5, 6, and 7, 1944, the Pennsylvania Salt Manufacturing Company formally opened its new Whitemarsh Research Laboratories at Chestnut Hill, Pennsylvania, near Philadelphia. During the four days of the opening, groups from various fields of science, industry, and education were invited to Whitemarsh and were conducted through the new laboratories. Saturday, the 7th, was reserved for company employees.

By utilizing an existing structure suitable for conversion, the Pennsylvania Salt Manufacturing Company has saved time, building materials, labor, and expense in creating an effective group of laboratories to meet the needs of its expanding research and development program.

Gold Plating Company Formed

The formation of a company dedicated to advancing the art of gold plating to an exact science is announced by Donham Craft, Inc., P. O. Box 273, Thomaston, Conn. Specialized equipment has been installed for putting into mass production a gold plating process developed in the past few years. The process readily adapts itself to the bulk plating of small items, but can be easily altered for use in connection with the plating of large complicated parts.

A. Harry Sanders Joins Enthone

A. Harry Sanders of New Britain, Conn., has joined The Enthone Company as a sales engineer. He will work throughout Northern Connecticut and Western Massachusetts in servicing Enthone customers.

Mr. Sanders was graduated from Trinity College in 1937 with a B.S. in chemistry. After graduation, he spent five years in the research laboratory of Underwood, Elliott, Fischer Co., Hartford, Conn., as a plating chemist. From 1942 to October 15, 1944, Mr. Sanders was finishing superintendent of North & Judd Mfg. Co., New Britain, Conn. He is a member of the American Electroplaters' Society.

Norton Appointments

Fred L. Curtis has been appointed manager of the Sales Engineering Department by Norton Company, Worcester, Massachusetts. He will be located in Worcester and will report directly to R. M. Johnson, general sales manager. Mr. Curtis has been with Norton Company for 16 years, first as abrasive engineer in Jackson, Michigan, and for the last five years as abrasive engineer in Detroit.

Fred W. Grant has been appointed merchandising engineer by Norton. He also will be located in Worcester reporting directly to R. M. Johnson, general sales manager. Mr. Grant has been with Norton Company for over 30 years and for the last 19 years has been abrasive engineer in the Milwaukee territory.

Paul H. Carlson has been appointed abrasive engineer for Milwaukee succeeding Mr. Grant, and E. C. Willey has been appointed abrasive engineer for the Moline, Illinois, area succeeding Mr. Carlson.

Udylite Silver Anniversary

According to L. K. Lindahl, president, The Udylite Corp., 1651 E. Grand Blvd., Detroit 11, Mich., will celebrate this month the completion of 25 years of activity in the field of metal finishing. During these years, the corporation has grown from a mere idea in the minds of a group of men to one of the largest manufacturers and distributors of metal-finishing equipment and supplies.

L. K. Lindahl

Udylite has representatives in all the principal industrial areas and maintains large and completely equipped research laboratories devoted exclusively to metal-finishing and allied problems.

Willis Returns to Pemco

After nearly four years with the armed forces in the United States, New Guinea, and Australia, Capt. "Jimmy" B. Willis returns to the technical laboratories of the Pemco Corporation in Baltimore.

Shortly after his graduation from the Ohio State University in 1939 in ceramic engineering, Capt Willis came to Pemco as an active member of the research staff in the technical laboratories. In December, 1940, he was called into active service with a commission of second lieutenant.

At Pemco, Capt. Willis is engaged in a highly specialized analytical development and in the near future hopes to release a paper on his findings which, it is stated, will be of unusual interest to the porcelain enameling industry.

Metal Cleaning Equipment Company Formed

The Optimus Equipment Company has been organized at Matawan, N. J., to design and manufacture a line of equipment for metal washing, rinsing, pickling, tumbling, and drying operations. While rendering an engineering service in connection with the building of specific types of equipment for special sequences of operations, the company will also introduce a number of standard models for general washing use in production, maintenance, and repair work.

The Optimus Equipment Company will function in close affiliation with the Hanson-Van Winkle-Munning Co., also of Matawan, New Jersey.

New Wheelco Vice President

Charles L. Saunders, former vice president of Minneapolis-Honeywell Regulator Co., has resigned as branch chief of the WPB Office of Civilian Requirements to become vice president of Wheelco Instruments Co., 847 W. Harrison St., Chicago, Ill., manufacturer of industrial indicating, recording, and control instruments.

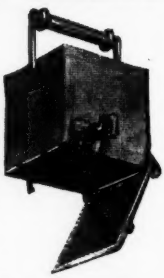
A graduate electrical engineer of the University of Virginia, Mr. Saunders previously served as sales correspondent and district manager of Brown Instrument in Birmingham, Houston, Pittsburgh and Chicago. With acquisition of the Brown company by Minneapolis-Honeywell in 1935, he was appointed Chicago regional sales manager and two years later became resident vice president of the company.

Mr. Saunders is recognized for valuable contributions to the science of instrumentation in many industries and has specialized in oil refining processes, the ceramic industry, and the metal industries.

ROLOCK

PROCESSING CARRIERS

Rolock custom-built carriers for metal parts speed operations, minimize rejects, cut costs . . . as illustrated by these Bottom-Dumping Stainless Steel carriers with trip release for use on automatic conveyor. Baskets, Crates, Trays, Racks, Fixtures, etc., designed for your specific operations, capacities to 6000 lbs., materials for all exposures.



SEND FOR CATALOG . . . 100 TYPES

ROLOCK, INC.

1400 Kings Highway East, Fairfield, Conn.

Dr. Wm. A. LaLande, Jr. Joins Pennsalt

Dr. William A. LaLande, Jr., formerly director of research of Attapulgus Clay Company, has joined the Research and Development Department of Pennsylvania Salt Manufacturing Company as director of research, according to announcement made by Dr. S. C. Ogburn, Jr., manager of research and development. Dr. LaLande will have immediate charge of the Research Division.

Mixing Equipment Appoints Representative

Mixing Equipment, Rochester, N. Y., manufacturer of Lightnin and Mixco mixers, announces the appointment of Edgar A. Rogers as exclusive representative in Georgia, Alabama, and the major portion of Tennessee.

Mr. Rogers received his technical education at the University of Arizona and Cornell University where he received the degree of Mechanical Engineer. He settled in the South shortly after the close of World War I in which he served as a lieutenant in the air force.

Having been engaged in consulting and sales work in the chemical and process industries in this territory for many years, Mr. Rogers enjoys a wide acquaintance among manufacturers and engineers. He will make his headquarters in the Chattanooga Bank Bldg., Chattanooga, Tennessee.

HORN

suggests—

NEW... LOW BAKE

SPEEDBAKE

PORCELAIN LIKE FINISH
NO DISCOLORATION
CLEAR AND IN ANY COLOR
ANY DEGREE OF GLOSS

A. C. HORN COMPANY
PRODUCTS FINISHING DIVISION
LONG ISLAND CITY 1, NEW YORK
CHICAGO • HOUSTON • LOS ANGELES

Ilg Expands San Francisco Office

Ilg Electric Ventilating Company has moved its San Francisco branch office to larger headquarters at 826 Sharon

James S. Rose

Bldg., 55 New Montgomery St., San Francisco 5, Calif. Ilg now operates seven branches in the Pacific division, located at Seattle, Salt Lake City, Phoenix, El Paso, San Diego, and San Francisco, all under the management of C. E. Parks, 816 W. Fifth St., Los Angeles 13, California.

To manage the new branch office, Ilg has secured the services of James S. Rose, formerly supervisory methods engineer in charge of heating and ventilation, Curtiss-Wright Co., Buffalo, N. Y. A graduate of Virginia Military Institute, 1930, with a civil engineering degree, Mr. Rose was for two years employed in Ilg's Cleveland Office. Thus, he comes to the West Coast with an excellent background in both technical training and practical experiences in the heating and ventilating field.

Personnel Additions at Nankervis

The George L. Nankervis Co., 5408 Commonwealth Ave., Detroit 8, Mich., announces the recent addition to the personnel of H. M. Cherry as general manager. Mr. Cherry has a background of over 23 years practical experience in all phases of metal finishing and is a graduate chemical engineer, U. of M. 1918. He was first connected with the Metallurgical Division of the General Motors Laboratory and later with the Harrison Radiator Division of that corporation where he was superintendent of all polishing, plating, and metallurgical work. For 14 years he was Detroit district manager of the Hanson-Van Winkle-Munning Company, and for the past five years has been occupied as equipment engineer with the A. T. Wagner Company of Detroit.

Other additions to the Nankervis personnel include Donald C. Hulse as designing engineer and George R. Young as service engineer. Mr. Hulse is a specialist in the design of anodizing and plating racks and fixtures. He is also responsible for the design of many plant layouts in this area. Mr. Hulse was formerly assistant to the plant engineer of the DeSoto Division of the Chrysler Corporation where he supervised design and installation of metal-finishing equipment. He was previously in the Engineering Department of Great Lakes Steel Corporation.

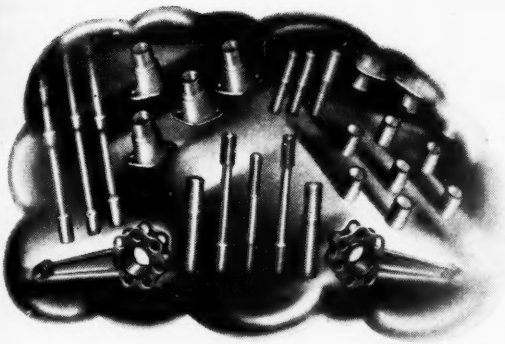
Mr. Young is a graduate mechanical engineer and has had a broad experience in the design and fabrication of heating, ventilating, and conveyor systems for metal-finishing plants. Early in his career, he was vice-president and treasurer of the Schweitzer Engineering Company, Detroit, leaving that position to become assistant to the plant engineer at the Plymouth Division of the Chrysler Corporation in charge of metal-finishing activities.

THE OUNCE OF PREVENTION WORTH POUNDS OF CURE!

NU-LITE { PLASTIC SLEEVES GLOVES *and* APRONS

• Low cost, light weight protection can boost production in your shop. Only 1/7th the weight of ordinary protective items—NU-LITE gloves, aprons and sleeves mean worker comfort . . . help control dermatitis induced by industrial irritants. Plastic fabric has remarkable resistance to water, oils, gasolines, acids, alkalis, degreasing and plating solutions. Write for prices, samples, complete information.

NU-LITE MANUFACTURING COMPANY
DEPT. PF *Plastic Development Consultants* **VERONA, N. J.**



THE ANTI-RUST OIL

Developed and Manufactured by Experienced Platers

for PLATING PLANT USE

Miccroil is an all-purpose high flash anti-rust oil. However, it was developed in the Michigan Chrome and Chemical Company laboratories primarily as an oil that would provide proper protection against the corrosive atmosphere prevalent in plating plants.

In the many plating plants where it is now used, metal parts covered with Miccroil have resisted corrosion and oxidation where the relative humidity has varied from 92% to 96% and temperatures have been between 85° F. and 90° F. It has proved most useful in selective plating, where portions of the part have been plated and the non-plated areas must be protected from corrosion immediately after the plating cycle is completed.

Full information on this oil which meets fully every requirement for plating plant use is yours for the asking.

Provides These Outstanding Advantages

HIGH FLASH POINT
Possibility of fire hazard reduced to minimum.

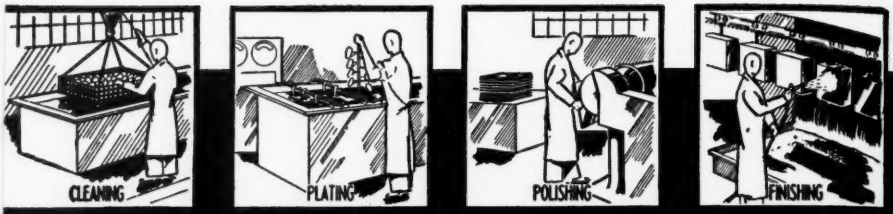
LIGHT IN COLOR
Does not alter appearance of part on which it is applied.

UNIFORM COVERAGE
Assures uniform and effective protective film over entire surfaces

NEVER BECOMES RANCID
Contains no ingredients which produce rancid odor.

MICCROIL

MICHIGAN CHROME & CHEMICAL CO.
6342 EAST JEFFERSON • DETROIT 7, MICHIGAN



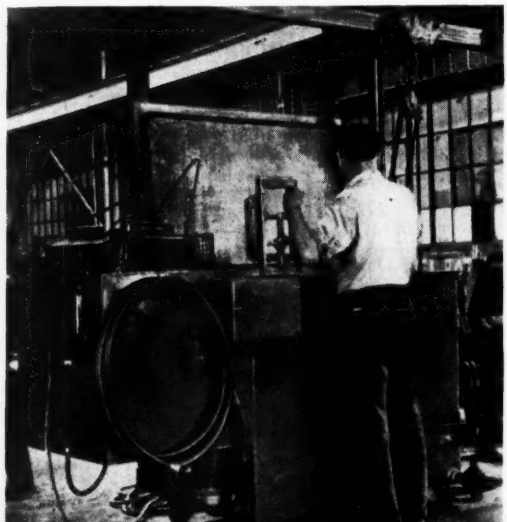
New Equipment and Materials

Optimus Type TA Dip-Agitating Cleaning Machine

Said to greatly reduce the time required in cleaning metal parts by providing a strong mechanical action to the parts, a portable dipping and agitating cleaning machine designated as the Type TA has been developed by the Optimus Equipment Co., Matawan, N. J. In addition to cleaning, the machine is recommended for use in paint stripping, rustproofing, and other chemical treatments.

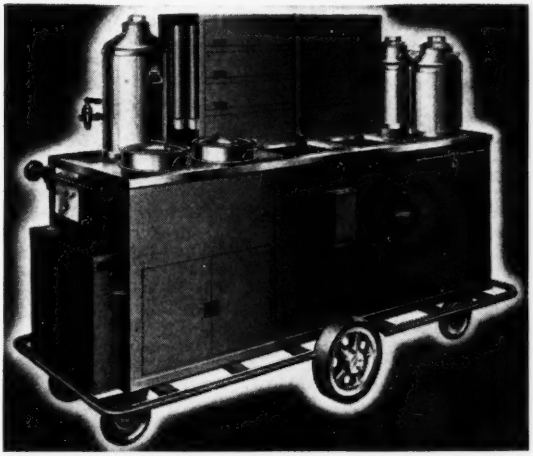
Essentially, the machine comprises a strongly built tank with a cleaning door, drain cock, thermometer, inlet cock, and dirt basket. The work is agitated vertically by a mechanism which moves it up and down, in and out of the cleaning solution. This results in a "brushing" action, during which the cleaning liquid hits the surface of the work as often as 30 times a minute. A removable frame supports the basket or the parts to be dipped in the solution, the frame being attached to a sturdy shaft resting on two large flanged bearings. The part of the frame outside of the tank supports the motor and speed reducer which act as a counterweight to the work, thus balancing the load. The entire assembly of motor, reducer, bearings, and frame is removable as a unit.

A similar machine, specially designed for heavy loads and difficult cleaning jobs, is pro-



Optimus Type TA Dip-Agitating Cleaning Machine

Blickman Model No. 1889
Mobile Canteen



vided with two tanks and one agitation motor. The tanks are separated to avoid thermal exchange if the temperatures used are not equal.

The Optimus Type TA Dip-Agitating Cleaning Machine may be used with any cleaning agent. Parts can either be sprayed, dipped, or both, since the machine is equipped with pump, hose, and nozzle for special jobs, and can be handled in baskets, racks, or individually. Overhead track and thermostatic control are available as optional equipment for the machine, which can be furnished in many sizes.

Blickman Model No. 1889 Mobile Canteen

The illustration herewith shows one of eight basic models of mobile canteens now being manufactured by S. Blickman, Inc., Weehawken, N. J. Designated as the Model No. 1889, this unit includes shelves for sandwiches, pies, fruits, candies, cigarettes, and so on; a dry ice cooled ice cream drawer; two 4-gallon soup insets for service and two 3-gallon containers for reserve supply; an insulated electrically-heated 5-gallon coffee dispenser; a compartment for bottled cold drinks; paper cup dispensers; and storage space for miscellaneous supplies. Coffee and soup capacities can be varied to meet specific requirements. The approximate serving capacity of the unit is 200 persons.

The Model No. 1889 mobile canteen is constructed with a 3-inch ship-channel chassis, reinforced with angle iron. The superstructure, including the shelves and disappearing doors, is made of 18 gauge lacquer-finish steel. A batten bar is provided for locking doors in closed position. Doors have recessed finger grips.

The top of the body is constructed of 14 gauge stainless steel, with insulated sliding covers of 18 gauge stainless steel for cold drink compartments. A convenient push handle is mounted on the body. Pieces of 1¼-inch O. D. iron pipe mounted on heavy wrought iron channel and electrically welded to the chassis form a bumper for the unit.

To provide for mobility, the unit is equipped with two cast iron 12-inch diameter rubber-tired wheels mounted on 1¼-inch diameter steel axle welded to the chassis, as well as four 6-inch ball bearing swivel casters. Finished in gray lacquer except where stainless steel finish is specified, the canteen is furnished complete with an 8-foot, 3-conductor, rubber covered electric cable with cap and connector body.

The Blickman Model No. 1889 Mobile Canteen is approximately 87 inches long x 38 inches wide x 65 inches high overall. The body is approximately 78 inches long x 30 inches wide x 36 inches high to work top.

Selas "Liqui-jector"

Designed for use in connection with air guns, sprays and brushes in applying industrial finishes, a device which is constructed to automatically and continuously remove condensate (droplets, slugs, or mist) from compressed air and gas lines, to be known as the "Liqui-jector," is announced by Selas Corporation of America, Erie Ave. and D St., Philadelphia 34, Pa. Adaptable to air and gas lines up to 1¼-inch pipe size and normal line pressures, the device includes no moving parts and re-

quires no cocks, traps, or shutoffs in the drain line (which is open to the atmosphere). Action is entirely automatic and continuous through two porous tubes—one inherently water-repellent, the other water-permeable but air-impervious.

Basis of the product is a recently discovered method for automatically separating liquid and gas phases by virtue of the surface tension of the liquid. Compressed air entering the Liqui-jector passes through the first (and water-repellent) tube where it is stripped of moisture. The action is by coalescence of droplets on the surface of this tube—a coarse ceramic material with an average of 50,000 pore openings per square inch, each so small that the pressure drop across the tube is insufficient to permit water passage against the resisting diaphragm-action of its surface tension. The coalesced moisture drops to the bottom of the unit where it passes through the second tube (without loss of air) to outside atmosphere. This second tube is constructed of micro-porous porcelain, with an average of 720 million pore openings per square inch, and, being constantly wet by its wick action, is said to constitute

Selas "Liqui-jector"

a perfect air seal up to the rated limit working pressure of the unit. This rated pressure may be adjusted to user specification.

The Model A-151-1 Liqui-jector shown in the accompanying illustration is designed to accommdate lines up to ⅜-inch pipe size with line pressures up to 100 p. s. i. The oval shape of the unit allows for flush-against-the-wall installation—directly in the line—without the addition of elbows or other fixtures. Units to meet the greater demands of the larger lines are also being made available.

STRIPPING COPPER?

McKEON'S

"Liquid Sulphur"

offers

FREE

Sample
Consultation
Equipment design
Production Engineering

HELPS YOU

Save critical materials
Decrease costs
Increase production

SULPHUR PRODUCTS CO.
GREENSBURG PA.

Durad Fungus Resistant Coating No. 524

A fungus-resistant coating for phenolic parts of communications equipment to be used in tropical climates has been developed by Maas & Waldstein Co., 438 Riverside Ave., Newark 4, N. J. Known as Durad Fungus Resistant Coating No. 524, this varnish is designed for application on phenolic insulators, terminal blocks, junction blocks, and the fixed windings of motors, generators and dynamotors.

According to the manufacturer, Durad Fungus Resistant Coating No. 524 can be applied by spray, dip, or brush, and has been successfully tested for dielectric strength, hardness, flexibility and resistance to salt spray and thermal shock.

Announcing ---

ROCKLOID

A NON-CRITICAL ENAMEL

NO need to wait for the return of alkyds. Here's a superior baking enamel with no critical materials in its formula. Available now for war contracts and essential civilian uses. Rockloid, non-alkyd synthetic, possesses:

1. Extreme hardness with flexibility.
2. Top notch adhesion—no flaking.
3. Excellent resistance to salt spray, humidity, alkalies and solvents.
4. Fine appearance and color retention.

For full information send for Technical bulletin on ROCKLOID.

NOTE: ROCKLOID *may be had also in wrinkle finishes.*

Our laboratory facilities and specialized personnel are at your service.

SINCE 1870

STANDARD VARNISH WORKS

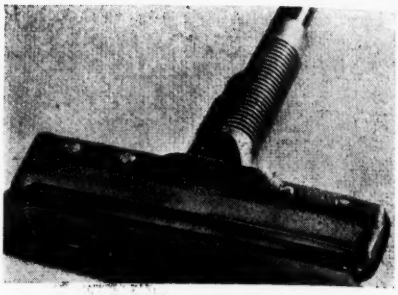
2600 Richmond Terrace
Staten Island, New York

2600 Federal Street
Chicago, Illinois

Ballou Chrome Aluminum Paste

A material which is said to produce a beautiful imitation of a real chrome plated finish on workpieces has been placed on the market by the Edward C. Ballou Co., 6 Varick St., New York 13, N. Y. The material is available in paste form and can be used with quick baking synthetics or varnished type vehicles. The material can also be mixed with lacquers.

Victor Flame Priming and Descaling Nozzle



Victor Flame Priming and Descaling Nozzle

A nozzle for use in descaling and flame priming steel plate prior to painting is announced by the Victor Equipment Co., 844 Folsom St., San Francisco, California.

Designed for easy attachment to any standard Victor welding torch butt, the nozzle features a spiral mixer and gas proportioner which is said to allow for the handling of large volumes of gas without back-fire or flash-back. In order to keep pre-mixed gases below ignition temperature, even within the proximity of the ribbon flame and deflected heat an Airadiator aluminum cooling section is incorporated at the nozzle head. Replaceable Meehanite skid shoes with properly shaped lugs are said to add substantially to the wearing life of the nozzle and enable it to be dragged at any suitable angle over the metal surfaces to be cleaned.

The Victor Flame Priming and Descaling Nozzle is made in four and six-inch ribbon flame widths, designated as the Model 361 and Model 362 respectively. Special circular multi-flame nozzles are also available.

COAT TOOL CHEST TRAYS WITH CELLUSUEDE FLOCK

Whether your product is tool chests, or something entirely different, chances are good that Cellusuede can heighten the beauty and utility of it immeasurably—and at low cost! In the case of the tool chest, the Cellusuede Flock coating protects both tools and chests from undue wear and scratching, and gives the chest a new richness in appearance. Write for Color Card, Prices, Samples.

Cellusuede FLOCK

CP Cellusuede Products, Inc. ROCKFORD, ILLINOIS

Keep Your Plant's Quota "OUT FRONT!"

Victory depends upon materials as well as men! To keep our American forces "closing in," every manufacturer here at home must keep on making "Out Front" Bond Quotas!

This calls for action now on every point in the 8-Point Plan to step up Payroll Deductions. For instance, have you a 6th War Loan Bond Committee? Selected Team Captains yet? If so, have you instructed them in sales procedure—and given each the Treasury Booklet, "Getting the Order?"

How about Bond quotas for departments—and Individuals? Assigning responsibilities is vital, too! Have you appointed "self-starters" to arrange rallies, competitive progress boards and meeting schedules? Are personal pledge cards printed and made out in the name of each worker? How about resolicitation near the end of the drive? Your State Payroll Chairman is ready with a detailed Resolicitation Plan. And, have you contracted for space in all your advertising media to tell the War Bond story?

Your positive Yes to all points in this forward-to-victory 8-Point Plan assures your plant meeting an "Out Front" Quota.

6th WAR LOAN

The Treasury Department acknowledges with appreciation the publication of this message by

PRODUCTS FINISHING

This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council.

"QXL" Liquid Cleaner

Designated as "QXL," a liquid cleaner which is said to be instantly soluble in the hardest water and even in salt water is now being offered by Technical Development Laboratories, Tenafly, N. J. An ideal cleaner for marine use, QXL, according to the manufacturer, is free from corrosives, non-toxic, harmless to hands or clothing, and leaves no objectionable odor or film.

QXL's action is accomplished by first softening the water in which the material is dissolved; then by the three-step process of wetting out, emulsification, and dispersion, which occurs simultaneously so that all dirt or grime can be instantly removed by rinsing or mere wiping. Uses for QXL include the cleaning of automobile bodies, aircraft, boats, walls, floors, and so on.

Amcoweld Plasti-Goggle

A safety goggle which is designed to afford undistorted and unrestricted vision together with maximum protection against impact hazards, to be known as the Amcoweld Plasti-Goggle,

Amcoweld Plasti-Goggle

is now being manufactured by the Eastern Equipment Co. Inc., Willow Grove, Pa. The goggle is made of one piece clear Plexiglas which, it is claimed, has the same qualities as the finest optical glass, thus enabling the goggle to be worn all day without eye strain or fatigue.

The lens area extends in an unbroken curve from temple to temple without corners or sharp bends. According to the manufacturer, the Amcoweld Plasti-Goggle is spatter resistant, light in weight, and, due to the smoothly rolled edges and ¾-inch wide full elastic headband, comfortable to wear.

"Phen-Cote"

A thermo-setting plastic that can be easily converted in a short baking cycle to an extremely hard yet flexible film which is said to be highly resistant to acids, alkalies, oils, greases, alcohol, solvents, and most chemicals, to be known as "Phen-Cote," has been placed on the market by the Watson Standard Co., 225 Galveston Ave., Pittsburgh, Pa. The material is adapted to spraying by hand or automatically or can be dipped or roller-coated, forming a continuous, homogeneous film which is claimed to be extremely corrosion resistant.

According to the manufacturer, Phen-Cote contains no oil modifier nor plasticizers which have a tendency to dilute or weaken the resistance of the film; therefore, the material produces a hard, indestructible, insoluble, flexible film. Phen-Cote is said to be readily adapted

For present day and post war problems, investigate

Equipment, which deburrs parts in mass production. If you are interested in saving up to 85% of your finishing cost, write today for full data.

LUPOMATIC TUMBLING MACHINE CO., INC
4510 BULLARD AVE. BRONX, N. Y.

to the production of linings for cans requiring linings having excellent oil resistance. As an exterior protective coating, the material will fabricate, process, and afford unusual corrosion resistance on black iron plate, electrolytic and hot dipped tin plates.

"Enamelstrip"

Known as "Enamelstrip," rustproofed and color-coated steel, zinc, and aluminum strip is now being marketed in ready-to-use coils by Enameled Metal Strip Corp., 20th and Walnut Sts., Allentown, Pennsylvania.

Enamelstrip is produced by a patented process of bonding an adhesive coating of enamel, lacquer, or paint to the surface of steel or other strip. Bonderized, coated and baked, Enamelstrip is said to withstand stamping, bending, forming, and drawing without harm to the flexible finish. It is supplied in thicknesses of from 0.006 to 0.030 inch, in widths from 7/32 to 24 inches, in tempers to suit specifications, and in any desired color or shade.

According to the manufacturer, Enamelstrip can be used in the production of stampings, moldings, tags, containers, instrument parts, metal covers, reflectors for lamps and fluorescent fixtures, clasps, clips and numerous other items.

Turco Zinctone Process

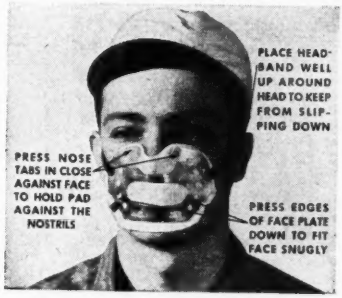
Zinctone, a quick chemical process for brightening and improving the corrosion resistance of zinc alloy die castings, is announced by Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif. The Zinctone process seals the outer "skin" of the casting, helping to protect it from mechanical penetration and corrosive attack. At the same time Zinctone is said to produce a smooth bright surface which compares favorably with the finish produced by mechanical polishing or buffing. The Zinctone process, it is claimed, does not change the color of the metal, but brings out a lustrous silvery bloom which greatly enhances the appearance of the casting.

The Zinctone process may be used as a treatment for new castings and as a method of reclamation for used zinc alloy die-cast parts. The process is said to remove stains and corrosion, seal, passivate, and brighten. Carburetors and fuel pumps are typical zinc alloy

Don't Breathe DUST

Use a MARTINDALE PROTECTIVE MASK

Weighs only 2/5 oz.


PLACE HEAD-BAND WELL UP AROUND HEAD TO KEEP FROM SLIPPING DOWN
PRESS NOSE TABS IN CLOSE AGAINST FACE TO HOLD PAD AGAINST THE NOSTRILS
PRESS EDGES OF FACE PLATE DOWN TO FIT FACE SNUGLY

These aluminum masks are so light and so comfortable to wear that there is no excuse for anyone breathing dust or dirt.

They are effective against all dusts except toxic dusts and asbestos or free silica. Used extensively for paints and enamels that do not contain dangerous pigments or thinner.

Filter pads or refills can be changed in five seconds.

Send $1.25 for a Special Trial Kit containing 2 Masks and 50 Refills.

(Ohio customers add 4c Sales Tax.)

Complete information in Mask Bulletin No. 348.

Martindale Electric Co.

1367 HIRD AVE. CLEVELAND 7, OHIO

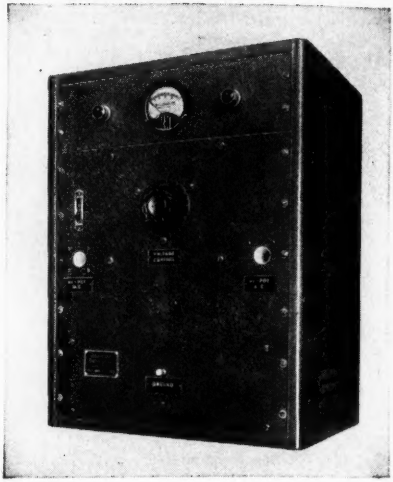
die-cast parts which may be reclaimed by means of the Zinctone process.

Adaptable to both small shop and mass production setups, the Zinctone process makes use of simple, easily available immersion equipment and may be employed entirely by unskilled personnel, it is claimed.

Industrial Instruments Type P-3 Voltage-Breakdown Tester

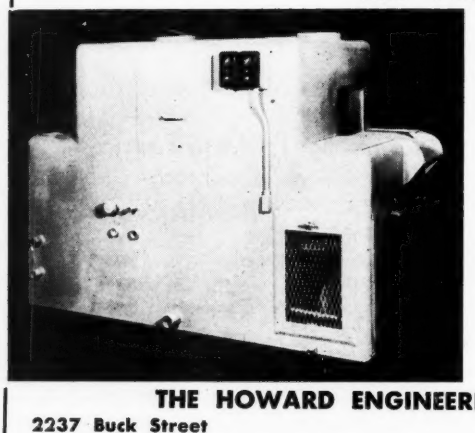
A simple, positive, safe and quick means of testing voltage breakdown of materials or components is said to be provided by the Type P-3 Voltage Breakdown Tester now being offered by Industrial Instruments, Inc., 17 Pollock Ave., Jersey City, N. J. The operating range of the unit is 0 to 10,000 volts, d. c. or 0 to 8,000 volts, a. c. A lower range unit, Type P-1, with sloping panel has a range of 0 to 4,000 volts, d. c. or 0 to 3,000 volts, a. c. The voltage is continuously variable over the entire range.

The Industrial Instruments Type P-3 Voltage-Breakdown Tester can be operated directly from 110-130 volt 50/60 cycle lines. A panel light indicates when unit is "on." Breakdown is indicated by a red signal light, while a



Industrial Instruments Type P-3 Voltage-Breakdown Tester

HOWARD Small, Compact WASHER for Full - Scale Production



This inexpensive HOWARD machine has a full capacity pump, washes and drains all types of parts—separately or in baskets, on standard link-type conveyor belt. Ideal for the plant with minimum floor space, needing mass-production cleaning at low cost. Write for complete details. HOWARD Engineers will gladly help solve your cleaning or finishing problems.

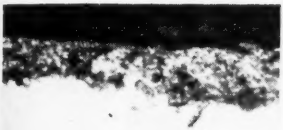
Send For CATALOG

THE HOWARD ENGINEERING & MFG. CO.

2237 Buck Street Cincinnati 14, Ohio

FACTS About SYCONIZING With SYCOLOY

SYCO PRODUCTS CO. HOT-DIPPED STEEL PHOTOMICROGRAPH



SYCOLOY APPLICATION SHOWS BOND BETWEEN STEEL AND ALLOY

- ★ SYCOLOY: A lead-base hot dip alloy BONDS with steel. One Dip Process.
- ★ Application of .0003 to .001 gives almost double protection against corrosion due to the BONDING quality of SYCOLOY.
- ★ 200 Hour Salt Spray Test on Production Parts.
- ★ Paint, Lacquer or Chrome applied direct to SYCONIZED steel requires no previous preparation and WILL NOT CHIP. *Investigate Today.*

IT BONDS IT PENETRATES IT LUBRICATES

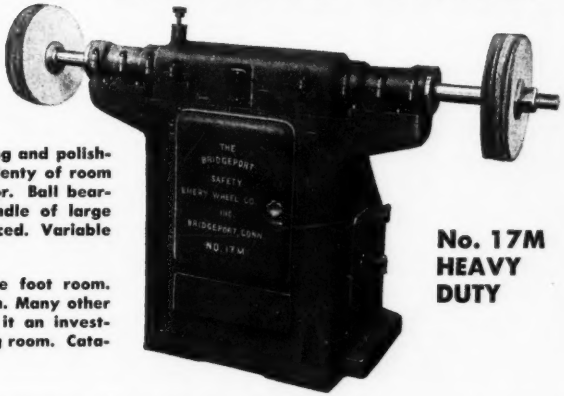
SYCO PRODUCTS COMPANY

5-220 General Motors Bldg. Detroit 2, Michigan

Bridgeport

BUFFING LATHES

BUILT TO DO GOOD WORK *FAST!*



No. 17M HEAVY DUTY

Specially suitable for buffing and polishing large work requiring plenty of room to swing. 10 H.P. AC Motor. Ball bearing, high carbon steel spindle of large diameters, accurately balanced. Variable spindle speed.

Straight front allows ample foot room. Improved lubrication system. Many other improvements go to make it an investment for any metal finishing room. Catalog on request.

THE BRIDGEPORT SAFETY EMERY WHEEL CO., INC., BRIDGEPORT, CONN.

built-in meter indicates the direct-reading voltage. Current-limiting resistors safeguard the equipment in the event of a dead short by limiting the current to approximately 50 milliamperes.

To speed up production testing, a drawer-switch type fixture is available. This fixture includes a jig to accommodate given components or materials, and, when the drawer is closed, the voltage is said to be applied with absolute safety for the operator. External connection is made by means of an insulated plug, which is inserted in the high-potential a. c. or d. c. jack, with the other side grounded.

The Industrial Instruments Type P-3 Voltage-Breakdown Tester is housed in a fine-grained crackled-enamel metal cabinet measuring 15 x 21 x 28 inches high.

Randolph "25" Carbon Dioxide Fire Extinguisher

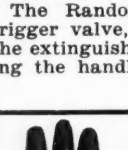
A 25-lb. wheel-type carbon dioxide fire extinguisher that can be moved and operated with an uninterrupted, single-sweep action, to be known as the Randolph "25," has been placed on the market by Randolph Laboratories, Inc., 8 E. Kinzie St., Chicago 11, Illinois.

The Randolph 25 features a palm-trigger valve, mounted conveniently on the extinguisher steel handle. By grasping the handle, the operator can move the unit and press the release button with one hand, thereby discharging a penetrating blanket of carbon dioxide in a large, sweeping arc of 10 to 20 feet. Release of the pressure on the palm-trigger automatically stops the flow of carbon dioxide gas.

Randolph "25" Carbon Dioxide Fire Extinguisher in Use

The long-range 5¾-foot horn-and-hose allows for accurately directing a full charge of gas into the base of the flames and, at the same time, enables the operator to remain at a safe distance from the heat of the fire. Mounted on hard rubber wheels, the unit is self-balanced.

According to the manufacturer, the Randolph 25 Carbon Dioxide Fire Extinguisher is especially recommended for protection against gasoline, oil, paint, grease, machine, electric, and surface fires in shops, shipyards, and refineries.



EDMONT
INDUSTRIAL GLOVES
Acid-Caustic-Oil PROOF
Synthetic Rubber Coating. Fabric Reinforced Lining
for MEN and WOMEN
EDMONT MFG. CO.
509 Orange St., Coshocton, O.

For a real good polishing job use
KEYSTONE EMERY
TURKISH — NAXOS — AMERICAN
KEYSTONE EMERY MILLS Write for Sample 4316 Paul St., Phila., Pa.

"Tygon" Corrosion-Resistant Paint

An all-purpose acid and alkali-resistant paint to be known as "Tygon" is announced by The United States Stoneware Co., 60 E. 42nd St., New York 17, N. Y. The paint is designed for use on chemical and process equipment, laboratory walls, floors, tables, and so on, and in pickling, plating, and etching departments for protection against highly corrosive fumes and acid spillage.

"Tygon" Paint is said to be resistant to such acids as nitric, hydrochloric, hydrofluoric, acetic, sulphuric, chromic, and other acids.

Preferred "WhiteHot" and "Pyro-Chrome" Protective Coatings

To provide maximum protection to metallic and non-metallic surfaces against corrosion, oxidation, and heat, two protective coating materials to be known as Preferred "White Hot" and Preferred "Pyro-Chrome" are now being marketed by Preferred Utilities Manufacturing Corp., 1860 Broadway, New York 23, New York.

Preferred White Hot is intended for temperatures up to 2,840 deg. F., and derives its heat-resisting properties from titanium—a pure white mineral substance of very high reflective qualities. Preferred Pyro-Chrome, grass green in color and also highly heat reflectant, is designed for heavy duty use, enduring temperatures up to 4,000 deg. Fahrenheit.

Preferred White Hot and Pyro-Chrome protective coatings can be applied with a brush, spray, or by dipping. They are said to spread easily and adhere firmly. Applied at normal room temperature, a coat, it is claimed, will dry in one to six hours, depending upon the nature of the underlying material, temperature, and humidity. One gallon of either coating is said to provide 200 to 400 square feet of coverage, depending upon the smoothness or porosity of the surface to be coated. Both materials are supplied ready for use in metal cans or drums.

Preferred White Hot and Pyro-Chrome Coatings are recommended for boiler combustion chambers, vaporizing oil-burner combustion chambers, electric furnaces, kilns, ovens, high-temperature steam-lines, and so on.

Guaranteed effective, Ridsmel works with lightning swiftness. A few economical drops dispel every trace of irritating paint smell quick as a wink. Not after the paint has been applied—*but before!* Safe, harmless; equally satisfactory in varnish and enamel. Used in industrial plants, shipyards, hotels, hospitals.

Send for Trial Bottle
$5 Size F. O. B., N. Y.
(Good for 200 Gallons of Paint)

Holley Chemical Co.
126 E. 25th St.
New York 10, N. Y.

COMMENDED PARENTS' MAGAZINE CONSUMER SERVICE

Iridite Blue Black

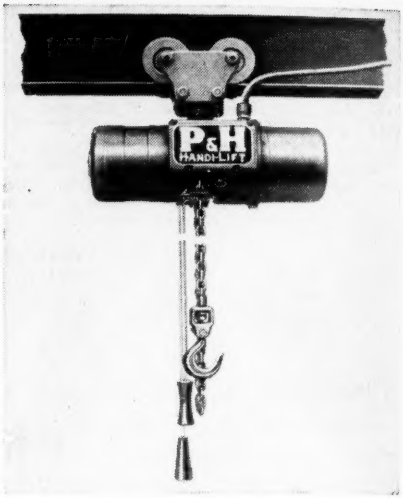
Applicable to cadmium as well as zinc surfaces for protection from corrosion, an Iridite Blue Black coating which is said to have many advantages over the regular Iridite Black is announced by Rheem Research Products, Inc., 2523 Pennsylvania Ave., Baltimore 17, Md. According to the manufacturer advantages of Iridite Blue Black include elimination of fading, higher corrosion resistance, and distinctive decorative value.

P&H "Handi-Lift" 500-Lb. Electric Chain Hoist

Adaptable for bolt, hook, or trolley mounting, an electric chain hoist of 500-lb. capacity, to be known as the P&H "Handi-Lift," has been developed by the Hoist Division, Harnischfeger Corp., 440 W. National Ave., Milwaukee 14, Wis. Of fully enclosed construction to allow for use under any condition of weather, dust, moisture, or acid fumes, the hoist, in trolley service, can be suspended either parallel or crosswise to beam. The chain of the unit is proof-tested for 1800 pounds.

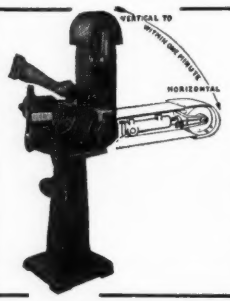
The Handi-Lift can be easily operated by one hand through a convenient pull cord actuating a simple lever toggle arrangement, thus leaving the other hand free to guide the load. The chain wheel, which is forged of high carbon steel and heat treated, is splined to the drive gear. Over-travel of hook at both upper and lower limits is prevented by a zinc die-cast safety limit stop which also actuates control for raising and lowering loads.

Dual braking is provided by a large spring-set electric motor brake which automatically releases when hoist is operated and sets instantly with shutoff current. Lowering control is effected by dynamic means supplemented by the spring-set brake which holds the load should current fail. All brake parts are die-cast.



P&H "Handi-Lift" 500-Lb. Electric Chain Hoist

Additional features of the Handi-Lift include anti-friction bearings throughout; simplified planetary gear drive, with long life assured by husky drop-forged stub-tooth gearing; flood lubrication; silver-to-silver switch contacts to provide positive trouble-free circuit; high-starting torque, reversible type motor with sealed bearings; wide-mouthed forged steel hook equipped with ball bearings for free swiveling, and yoke which can be used as a clevis by removing hook. The hoist is



"Production" Type S
CENTERLESS
SURFACER • POLISHER • BUFFER
This machine combines a centerless feed polishing machine with a vertical or horizontal belt grinder, surfacer, polisher or buffer. Ideal for cylindrical polishing or straight line finishing on flat work. Can be used for anything that can be ground or polished—metals, rubber, fibre, wood, etc.
Write for Illustrated Folder
PRODUCTION MACHINE CO. • GREENFIELD, MASS.

Burring Problems Solved with ROBERTS Compounds

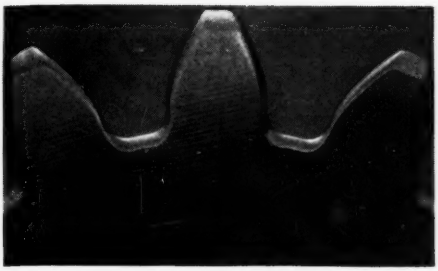


Photo-micrograph (at left) of Steel Spur Gear after brushing with Roberts Burring Compound. In addition to quickly removing the burrs and sharp edges, the fragmented metal on the surface of the gear teeth has been eliminated to produce a polished surface with all remaining tool marks well blended.

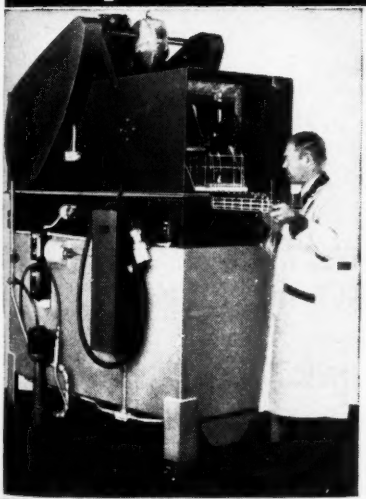
This finish was produced in 20 seconds on automatic equipment...formerly finished in 6 minutes by previous method.

Let us help you on your buffing problems. Write for suggestion and samples.

ROBERTS ROUGE CO.

STRATFORD, CONN.

Improved Vapor Degreasing



Speeds Up Work 1/3
Absolutely Non-Inflammable

Phillips' PHILLSOLV vapor degreasing solvent is tops for efficiency. It cuts vapor degreasing time by one third! Low toxicity—higher safety factor. PHILLSOLV, non-water soluble, has many applications in instrument and war plants. No corrosive action. Write for catalog on PHILLSOLV and complete line of electrical vapor degreasing machines.

FREE DEGREASING MANUAL

Contains specific information on degreasing problems, solvents, solvent toxicity and control, solvent recovery, and many practical applications.

SEND FOR COPY TODAY.

PHILLIPS MFG. CO., 3488 W. Touhy Ave., Chicago, Ill.

designed for operation on 3-phase 60-cycle current, 220 or 440 volts, and is supplied complete, ready to install as specified.

Fidelity Stripper No. 306

A "non-creeping" liquid which is said to provide for the quick stripping of finishes from metal, to be known as Fidelity Stripper No. 306, has been placed on the market by the Fidelity Chemical Products Corp., 430 Riverside Ave., Newark 4, N. J. The liquid is especially designed for the rapid removal of insulating coatings from wires and of baked enamels from objects which cannot or should not be submerged.

Fidelity Stripper No. 366 is applied by brush at room temperature and usually in less than a minute is said to cause the finish to puff and leave the metal. The metal is then wiped clean, and since there is no residue or corrosive action, the stripped part may be soldered or refinished without any after treatment, it is claimed. According to the manufacturer, the liquid does not run, thus enabling stripping to be limited to a specific section of coated surface.

Steel Grip Safeguard No. 15160

A thumb and two-finger guard designated as the Steel Grip Safeguard No. 15160 is now being offered by the Industrial Gloves Co., 746 Garfield Blvd., Danville, Illinois.

The guard is made of chrome leather and is large enough to fit over the regular cotton gloves, thus protecting those parts which are most subject to wear—the thumb and first two fingers. The guard also allows for use of gloves having worn out thumbs and fingers.

Steel Grip Safeguard No. 15160

As illustrated, the guard is inseam cotton thread sewed. It may also be obtained outseam steel stitched if desired.

Spero URC-448 Fluorescent Fixture

Designed to comply with latest WPB limitations on the use of metal, the Spero URC-448 Fluorescent Fixture illustrated herewith, product of The Spero Electric Corp., 18222 Lanken Ave., Cleveland, Ohio. is made for four 40-watt lamps, with translucent diffusing glass panels at side and bottom to shield the

FOR CONTROLLED, EFFICIENT PICKLING

WRITE

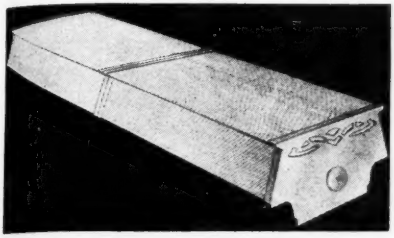
THE WM. M. PARKIN CO., • Highland Bldg., Pittsburgh, Pa.

NEP-ACID INHIBITOR—To Control Acid Action on Clean Metal

SUMFOAM PICKLING COMPOUND—To Control Fumes

"THOSE PERFECT PARTNERS FOR PICKLING"

light source. These specially developed glass panels are said to eliminate all objectionable glare and shadows and at the same time provide for a high degree of light intensity (16 foot candles



Spero URC-448 Fluorescent Fixture

per watt per square foot under tests).

Constructed to afford the most efficient light distribution, the Spero URC-448 Flourescent Fixture can be quickly and easily installed, the unit lending itself to three types of mounting—flush-to-ceiling, pendant, or continuous-row. Maintenance of the fixture is also said to be simple since the glass panels can be readily removed for cleaning and servicing lamps and wiring is easily accessible from below.

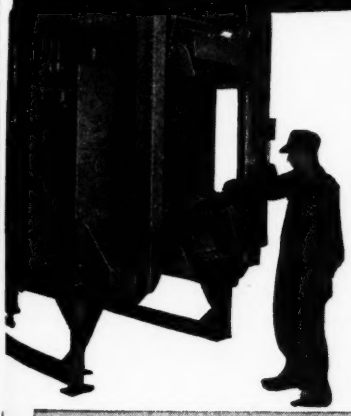
The Spero URC-448 Fluorescent Fixture is available with conventional type ballast and starters or with "Insta-Lite" which combines functions of ballast and starter, providing for instantaneous lighting.

Witco No. 675 Rust Inhibitor

A rust preventive material for protection of metal parts and equipment during storage, shipment, and, in some cases, in service has been developed by the Witco Chemical Co., 295 Madison Ave., New York 17, New York.

Known as Witco No. 673 Rust Inhibitor, the product is a cold-dip, rapid-drying coating that may be applied either by dipping or spraying since its viscosity is said to be comparable to that of water. According to the manufacturer, it fully conforms to Ordnance Specifications AXS-673, Rev. 1, Amend. II, is non-abrasive, non-corrosive, and may be easily removed with ordinary solvents.

BLAKESLEE SOLVENT DEGREASING



Save

TIME · MANPOWER · SPACE · MONEY
with SOLVENT VAPOR DEGREASING

Degreasing the Blakeslee Solvent Vapor way is economical. Blakeslee compact thoroughness and speed whether the parts be large or small, chip laden, coated or oily, gives greatest satisfaction and most dependable results. Saves time—makes money.

Remember Blakeslee when considering degreasing either in general or special ways. There is an ideal model for every application.

May we send our engineers? Complete descriptive literature upon request for either degreasing or Blakeslee highly efficient metal parts washers.

Illustration at left shows a Blakeslee Automatic Degreaser that handles either flat or rotary baskets.

G. S. BLAKESLEE & CO.

Main Office and Plant: Cicero Station, Chicago 50, Illinois
New York Toronto, Ontario

In addition, Witco No. 673 Rust Inhibitor features an extremely high melting point (in excess of 250 deg. F.) as well as flexibility at temperature of 20 deg. below zero. The material is supplied in standard 55-gallon steel drums.

Chemicals Wanted

The National Registry of Rare Chemicals, Armour Research Foundation, 33rd, Federal & Dearborn Sts., Chicago 16, Ill., has issued the following list of chemicals for which the Registry would like to find sources of supply:

Aluminum carbide
Arachin
Bismuth triethyl
Cadmium xanthate
Calcium tetraborate
Carbon tetraiodide
2,3-Dichloropropanol-1
2,3-Dichlorobutanol-1
Dichloroethanol
Any ester of linoleic acid
Ethyl or methyl-n-octyl amine
Ethyl or methyl-n-decyl amine
Ethyl or methyl-n-dodecyl amine
Mono allyl ether of ethylene glycol
Nitrogen tetrasulfide
Normal aliphatic primary amines of 9, 15, 19-29 carbons
Octachloro-n-propane
1-Phenyl-1-methyl glycidol
2,4-Pentadiene-1-ol
Sodium ferrite (1 to 5 pounds)

SOL-KLEAN
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Better Paint Adhesion
INDUSTRIAL CHEMICAL PRODUCTS CO.
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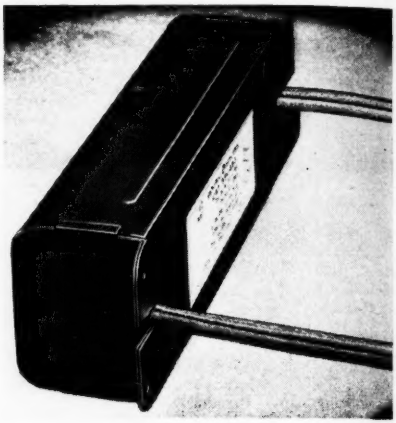
G-E Two-Way-Lead Ballasts for Mazda F Lamps

Two-way-lead ballasts for the operation of Mazda F lamps have been announced by the General Electric Co.,



G-E Two-Way-Lead Ballast for Mazda F Lamps

Schenectady 5, N. Y. The ballasts are available in the following ratings: Tulamp 30 and 40-watt, standard cross section; Tulamp 40-watt high voltage; Tulamp 100-watt; Three-lamp 40-watt; and Forlamp 100-watt.

With leads that can be brought out at either the ends or the bottoms of the ballast cases, the G-E Two-Way-Lead Ballasts are interchangeable with, and serve the same applications as, both the superseded leads-out-the-end and leads-out-the-bottom ballasts of the same ratings. They are equally applicable to exposed or enclosed mounting on both commercial and industrial fixtures. Provision for center-hole or corner mounting has been retained and fixture design changes are not required for application of the new ballasts.

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"MGC" ELECTROPLATING EQUIPMENT
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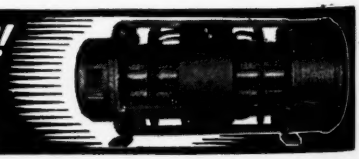
MOTOR GENERATOR CORP., HOBART ST. PF-114 TROY, OHIO



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HOTEL HOLLENDEN
In Columbus it's the
NEIL HOUSE

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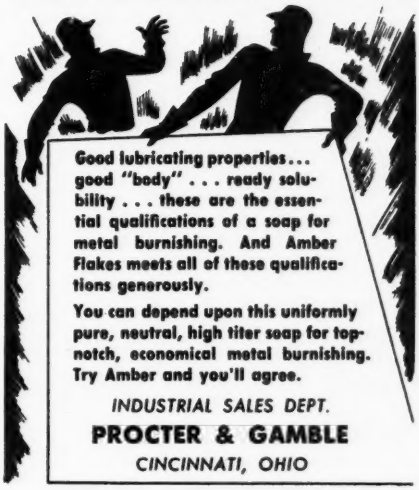
OTHER DeWITT HOTELS:
THE LANCASTER Lancaster, Ohio
THE BARON STEUBEN Corning, N.Y.

AMBER FLAKES
for efficient, economical
METAL BURNISHING!



Good lubricating properties... good "body" . . . ready solubility . . . these are the essential qualifications of a soap for metal burnishing. And Amber Flakes meets all of these qualifications generously.

You can depend upon this uniformly pure, neutral, high titer soap for top-notch, economical metal burnishing. Try Amber and you'll agree.

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Bristol Model 93 Air-Operated Controller

Designated as the Model 93, an indicating air-operated control instrument for controlling temperature, pressure, vacuum, liquid level, and humidity has been developed by The Bristol Co., Waterbury 91, Conn. The controller operates on the Free-Vane principle of automatic control, and has a throttling range of from ½ to 15 per cent, with the adjusting mechanism arranged so that changes in the throttling range

Bristol Model 93 Air-Operated Controller

can be made by the user without the need for tools.

The Bristol Model 93 Controller can be set to control at any value within its range by turning the control pointer to the desired value. The instrument is built so that it can be changed by finger adjustment from reverse to direct action, or vice versa.

Typical applications for the Model 93 controller include the control of temperatures in bake ovens, drying ovens, retorts, plating tanks, and soft metal pots, and the control of steam pressure in retorts, and so on.

Enthone Zinc Stripper

The Enthone Co., 484 Elm St., New Haven, Conn., announces the development of an alkaline stripper for the rapid removal of zinc plate. According to the manufacturer, the product provides for the quick stripping of zinc-

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"BLAXITE"

RAPID BLACK OXIDE FINISHES

for

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REMOVES OIL, GREASE, SMUT, GRIME, DRAWING AND BUFFING COMPOUNDS. **BIONOL** LEAVES A CHEMICALLY CLEAN SURFACE. **BIONOL** IS NON-TOXIC, NON-CAUSTIC, NON-CORROSIVE, NON-INFLAMMABLE AND HARMLESS TO THE SKIN.

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plated coatings of all types, with resultant clean and bright metal surfaces.

Due to the alkaline nature of the solution, the tendency of steel to rust after stripping is said to be largely eliminated. The base metal, it is stated, is absolutely free from attack by the stripper and, therefore, is left in its original clean condition after stripping.

Enthone Zinc Stripper is said to be effective for removing zinc coatings that have been treated with various chromate processes and for all types of bright zinc plates. The stripper is supplied as salts which are added to water in the concentration range of 2 to 3 pounds per gallon. The mixture is then heated to a temperature of from 200 to 215 deg. F. Plain steel tanks and heating coils are used.

Enthone Zinc Stripper, the manufacturer claims, is ideal for the removal of zinc from defective plated work and from plating racks, wires and hooks in automatic cycles.

Duraplex AL-210 Resin

A drying-oil type resin to be known as Duraplex AL-210 is announced by the Resinous Products & Chemical Co., 222 W. Washington Square, Philadelphia, Pa. The resin is adapted to air-drying finishes and is designed for use in protective paints for freight cars and structural steel, aluminum paints, red lead primers, and other types of paints. It is said to produce coatings that are flexible, possess good adhesion and excellent wearing qualities.

Duraplex AL-210 is supplied as a dark colored, viscous liquid which pours slowly at room temperature. Said to be a good general purpose grinding medium for air-drying paints and enamels, the resin is soluble in mineral spirits and other aliphatic hydrocarbons, turpentine, xylol, toluol, esters, and ketones. It is said to tolerate the addition of cold cut resins, raw and bodied oils, and certain blending varnishes.

According to the manufacturer, films of Duraplex AL-210 are not heat reactive and remain essentially unchanged after short bakes at temperatures as high as 400 deg. F. The resin itself, however, is said to body further when heated in a kettle and can be converted to a gel by heating for several hours at a temperature in the range of from 450 to 475 deg. Fahrenheit.

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No resistance is built up and there is no forcing of the filtering process, as the "horizontal plate" design strictly follow the laws of gravitation. The process is free, easy, natural, downward.

This increases the volume of filtrate per operating hour, adds to the bright polish, reduces the quantity of filter aid and prolongs the filtering cycle.

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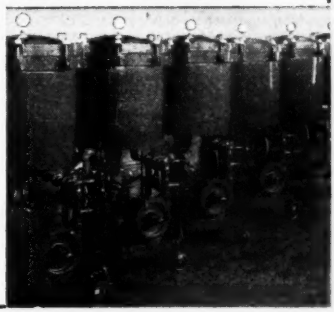

Dustkop Dust Collectors. A 24-page bulletin of individual type self-contained dust collectors for collecting dust from all sizes of surface, tool, pedestal, and disc grinders and sanders is now being distributed by the Aget-Detroit Co., 604 First National Bldg., Ann Arbor, Mich. Feature of the bulletin is the indexing which is according to grinder sizes rather than by dust collectors, and which permits rapid selection of the desired dust collecting equipment.

Dimensions of the dust collecting units are provided in sketches as well as in specification tables in each section. Accessories required for the installation, together with the prices, of the complete dust collecting units are listed at the front of each section. Copy of Bulletin A-200 free upon request.

Opportunity Section

Sales Representation Wanted

Manufacturers' Agents or Wholesalers equipped to furnish active sales coverage in N. Y. City, Phila., or N. E. territories. Black oxidizing salts and allied lines for metal working and plating industries. The Tobler Chemical Co., 28 Oliver St., Boston 10, Mass.

Industrial Salesman Wanted

A midwestern manufacturer of all types of varnish, lacquer and enamel for Industrial plants, wants a salesman for Indiana. Apply giving age and experience. Box No. 113, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

Production Engineer Wanted

A large, well established job-plating company in the Midwest is interested in contacting a man of broad experience and proven ability in all phases of plating, metal finishing and allied processes. The man we want must know his electro-chemistry as well as practical production methods. He must have initiative and qualifications to become an executive who can command the respect of key personnel as well as organizing ability to enable his assuming complete responsibility for quality and maximum production. To such a man, we can offer a substantial salary and unlimited opportunity for security in the post war era. Write us immediately all about yourself stating age, salary expected, availability, etc., so we can arrange personal interview at our expense. Write Box No. 118, Products Finishing, 431 Main St., Cincinnati 2, Ohio.

PAINT SALESMAN WANTED

Desire an industrial paint salesman with at least five years experience. Salary and commission. Write Box 116, care of Products Finishing, 431 Main St., Cincinnati 2, Ohio.

Wanted—Plating Foreman capable taking full charge decorative plating dept. Michigan plant. Excellent opportunity for man between 25-35 years of age with a good background. Write Box 114, care of Products Finishing, 431 Main St., Cincinnati 2, Ohio.

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★ We have several excellent opportunities available now and postwar in this rapidly expanding department of our business.

Apply by letter giving details of your experience.

THE COWLES DETERGENT COMPANY
7016 Euclid Avenue Cleveland 3, Ohio

Bristol Model 93 Air-Operated Controller. An eight-page bulletin published by The Bristol Co., Waterbury 91, Conn., describes an air-operated controller, designated as the Model 93, for the control of temperature, pressure, vacuum, liquid level, humidity, and flow. Copy of Bulletin No. A115 free upon request

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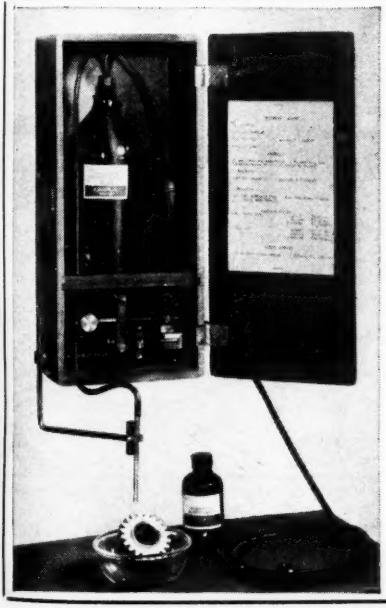
"Burring—Its Rapid Evolution from Hand Methods to Mechanical" is the title of an illustrated article by R. P. Crane, vice president, The Lea Manufacturing Company, which has been published in booklet form and is now being distributed by this firm. Copies are available free of charge by writing to The Lea Manufacturing Co., Waterbury 86, Connecticut.

Triple-A Protective Coatings Catalog. A 24-page illustrated catalog containing complete information on the various protective coatings for iron, steel, brick, concrete, and other surfaces, offered by the Quigley Co., Inc., 527 Fifth Ave., New York 17, N. Y., has been prepared by this firm. Copy free upon request.

Belke Metal Finishing Equipment and Supplies. The first of a series of folders containing illustrated, descriptive, and price information on the various metal finishing equipment and supplies marketed by the Belke Manuacturing Co., 947 N. Cicero Ave., Chicago 51, Ill., has been released by this firm. Copy of folder, as well as succeeding pieces of literature to be issued, will be sent free to interested individuals upon request.

Koroseal Tape RX and Korolac RX (a solution of Koroseal) easy-to-apply protective coatings for plating racks are the subject of a catalog section issued by The B. F. Goodrich Co., Akron, Ohio. Characteristics and properties of Koroseal and Korolac which make them useful for this service are outlined in the catalog section, together with well illustrated instructions on how they should be applied. Copy of Catalog Section 8505 free upon request.



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